

BLAUPUNKT

Bosch Telecom



V19668

Video Recorder

BV-245 EGC	7 618 361
BV-245 EC	7 618 371
BV-245 OIRT	7 618 381
BV-445 OIRT	7 618 374
RTV-205 PSW	7 618 391

Service Manual

Supplementary documentation

Spare Parts List (K7/VKD 1 D 95 300 006)

K7/VKD 1 D95 400 013

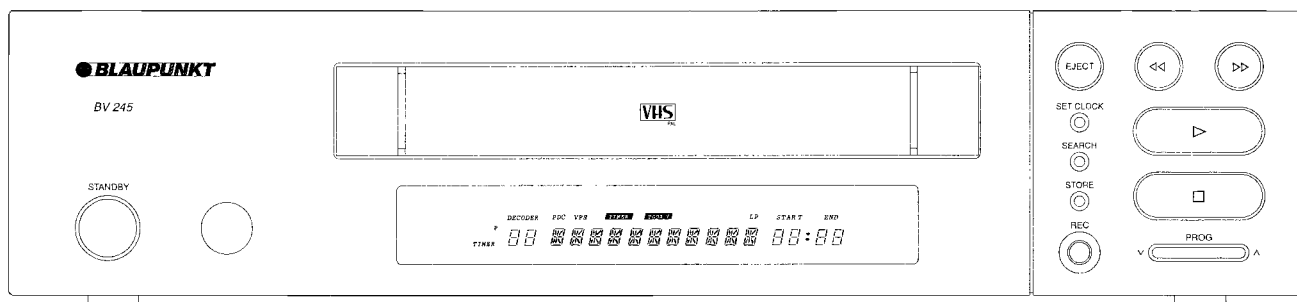


TABLE OF CONTENTS

	Page		Page
CHAPTER 1		CHAPTER 4	
TECHNICAL DATA AND FEATURES		TAPE DECK ECO	
Front page	1-1	<i>Deck parts replacement</i>	
Table of contents	1-2	Auxiliary tools for deck adjustment	4-1
Survey of sets and features	1-3	Deck layout diagrams	4-2
Survey of sets and PCB's	1-4	Lift	4-2
Technical specifications/Safety instructions	1-6/7	Head disc	4-3
Front/rear view of the set	1-8	A/C Head	4-4
Remote control	1-9	Threading motor	4-4
CHAPTER 2		Capstan motor	4-5
TOOLS FOR ERROR DIAGNOSIS		Pressure roller	4-5
Error diagnosis system	2-1/3	Roller unit right	4-5
Option list	2-4	Roller unit left	4-5
Servicing of SMDs	2-5/6	Sensor print assy	4-6
Dismantling of the set	2-7/8	<i>Adjustments</i>	
Circuit descriptions	2-9/16	Tape path	4-6
Adjustment procedures	2-17/20	„Roller unit left; roller unit right“	4-6
List of abbreviations	2-21/23	A/C Head	4-6
CHAPTER 3		Horizontal distance	4-7
PRINTED BOARDS		Brake band	4-7
Wiring diagram Olivia Eco	3-1	Tape tension adjustment	4-7
Block diagram analog part Olivia Eco	3-2	Friction clutch control	4-7
Block diagram digital part Olivia Eco	3-3	Reverse brake control	4-7
<i>Power supply NSM1/1A</i>		<i>Exploded view</i>	
PCB drawing NSM1/1A	3-4	Cleaning and lubrication	4-8/9
Circuit diagram NSM1/1A	3-5	CHAPTER 5	
<i>Head amplifier OHA</i>		Exploded view of cabinet parts	
Circuit diagram OHA	3-6	5-1	
PCB drawing OHA	3-7		
<i>Family board OFB Olivia Eco</i>			
PCB drawing Family board	3-8/9		
Video/Chroma -VS circuit diagram	3-10		
Audio linear-AL circuit diagram	3-11		
Frontend-FV circuit diagram	3-12		
IN/OUT-I/O circuit diagram	3-13		
Tape deck sensor panel	3-14		
Deck electronics-DE circuit diagram	3-15		
<i>Input/Output board OIO</i>			
Circuit diagram OIO	3-16		
PCB drawing OIO	3-17		
<i>Operating panel ODCL2</i>			
PCB drawing	3-18		
Circuit diagram	3-19		

FEATURES


		PAL B/G	PAL I FOR IRELAND	PAL I FOR UK	PAL B/G - SECAM B/G, D/K	PAL B/G - SECAM L/L', B/G	2 VIDEO HEADS	4 VIDEO HEADS	LCD REMOTE CONTROL	VPS	TRANS. IDENTIF. VIA VPS/PDC	VIDEO LONG PLAY	FRAME ADVANCE	SLOW MOTION	SUPER SLOW MOTION	DOUBLE FINE SLOW	FIELD ADVANCE	NTSC PLAYBACK	2 SCART CONNECTORS	6 SEC. BACK UP OF CLOCK & CAL. EVENTS	PRESETS NUMBER 42	NUMBER OF EVENTS 4	HYPERBAND/CABLE TUNER
BV-245 EC		•					•						•							•	•	•	•
BV-245 EGC		•					•			•			•							•	•	•	•
BV-245 OIRT					•		•			•			•					•		•	•	•	•
BV-445 OIRT					•			•		•		•	•	•	•	•	•	•		•	•	•	•
RTV-205 PSW					•	•							•						•	•	•	•	•

Exploded view diagram of the internal components of a device, showing the following parts:

- HEAD AMPLIFIER (OHA)
- FAMILY BOARD (OFB)
- IN/OUT (OIO)
- POWER SUPPLY (NSM)
- OPERATING PANEL (ODC)

Safety instructions

- Safety regulations demand that the set be restored to its original condition and that components identical with the original types be used.

Safety components are marked by the symbol 


- All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair may reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools on the same potential.
- A set to be repaired should always be connected to the mains via a suitable isolating transformer.
- Never replace any modules or any other parts while the set is switched on.
- Use plastic instead of metal alignment tools. This in order to preclude short-circuit or to prevent a specific circuit from being rendered unstable.

Remarks

- The direct voltages and oscillograms ought to be measured relative to the set mass.
EXCEPTION
At the power supply, the DC voltages and the oscillograms at the primary side are measured to LIVE GND.
- The direct voltages and oscillograms mentioned in the diagrams ought to be measured with a colour bar signal and the picture carrier at 503.25 MHz (C25).
- The oscillograms and direct voltages have been measured in RECORD or PLAY mode.
- The semiconductors, which are mentioned in the circuit diagram and in the parts lists, are fully exchangeable per position with the semiconductors in the set, irrespective of the type designation of these semiconductors.

Sicherheitshinweise

- Die Sicherheitsvorschriften erfordern es, daß sich das Gerät nach der Reparatur in seinem originalen Zustand befindet und daß die zur Reparatur benutzten Ersatzteile mit den Originalersatzteilen identisch sind.

Sicherheits-Bauteile sind mit der Markierung  versehen

- Alle IC's und Halbleiter sind empfindlich gegen elektrostatische Entladungen (ESD). Unvorschriftsmässige Behandlung von Halbleitern im Reparaturfall kann zur Zerstörung dieser Bauteile oder zu einer drastischen Reduzierung der Lebensdauer führen. Sorgen Sie dafür, daß Sie sich im Reparaturfall über ein Armband mit Widerstand auf dem gleichen Potential, wie die Masse des Gerätes befinden. Alle Bauteile, Werkzeuge und Hilfsmittel sind auf das gleiche Potential zu legen.
- Ein zu reparierendes Gerät ist immer über einen Trenntransformator an die Netzspannung anzuschließen.
- Bei eingeschaltetem Gerät dürfen keine Module oder sonstige Einzelteile ausgetauscht werden.
- Zum Abgleich sind ausschließlich Kunststoffwerkzeuge zu benutzen (keine Metallwerkzeuge verwenden). Dadurch wird vermieden, daß ein Kurzschluß entstehen kann oder eine Schaltung instabil wird.

Anmerkungen

- Die Gleichspannung und Oszillogramme sind gegen Gerätemasse zu messen.
AUSNAHME
Beim Netzteil sind die Gleichspannungen und Oszillogramme auf der Primärseite gegen LIVE GND gemessen.
- Die Gleichspannungen und Oszillogramme angeführt in den Schaltbildern sollen unter folgenden Bedingungen gemessen werden: Farbbalkensignal, Bildträger auf 503.25 MHz (C25)
- Die Oszillogramme und Gleichspannungen sind in RECORD oder PLAY gemessen. Die in den Stücklisten aufgeführten Bauteile sind positionsweise voll auswechselbar gegen die Bauteile in dem Gerät, ungeachtet der etwaigen Typenbezeichnungen.

Avertissements

- Les normes de sécurité exigent qu'après réparation l'appareil soit remis dans son état d'origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.

Les composants de sécurité sont marqués 


- Tout les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD). Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation. Lors de réparations s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfilier le bracelet serti d'une résistance de sécurité. Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.
- Toujours alimenter un appareil à réparer à travers un transfo d'isolement.
- Ne jamais remplacer les modules ni d'autres composants quand l'appareil est sous tension.
- Pour l'ajustage, utiliser des outils en plastique au lieu d'instruments métalliques. Ceci afin d'éviter les court-circuits et exclure l'instabilité dans certains circuits.

Observations

- La mesure des tensions continues et des oscillogrammes doit se faire par rapport à la terre de l'appareil.
EXCEPTION
Sur l'unité d'alimentation la tension continue et l'oscillogramme sont mesurés sur le côté primaire en Live GND.
- La mesure des tensions continues et des oscillogrammes figurant sur le schéma doit se faire dans un signal de barre couleur porteuse image sur 503.25 MHz (C25).
- Les oscillogrammes et tension sont mesurées en mode RECORD ou PLAY.
- Les semi-conducteurs indiqués dans le schéma de principe et à la liste des composants, sont interchangeable par repère sur ce chassis avec les semi-conducteurs de l'appareil quelle que soit la désignation de type donnée sur ces semi-conducteurs.

Veiligheidsinstructies

- Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, indientiek aan de oorspronkelijke, worden toegepast.

De veiligheidsonderdelen zijn aangeduid met het symbool 


- Alle IC's en vele andere halfgeleiders zijn gevoelig voor elektrostatische ontladingen (ESD). Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen. Zorg ervoor, dat U tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat. Houd componenten en hulpmiddelen ook op hetzelfde potentiaal.
- Sluit een apparaat dat gerepareerd wordt altijd via een scheidingstransformator aan op de netspanning.
- Verwissel nooit modules of andere onderdelen terwijl het apparaat is ingeschakeld.
- Gebruik voor het afregelen plastic i.p.v. metalen gereedschap. Dit om mogelijke kortsluiting te voorkomen of een bepaalde schakeling instabiel te maken.

Opmerkingen

- De gelijkspanningen en oscillogrammen dienen gemeten te worden ten opzichte van de apparaat aarde.
- De gelijkspanningen en oscillogrammen vermeld in de schema's dienen gemeten te worden met een kleurbalkensignaal beeldraaggolf op 503.25 MHz (C25).
- De oscillogrammen en gelijkspanningen zijn in RECORD of PLAY mode gemeten.
- De halfgeleiders, die in het pricipeschema en in de stuklijsten, zijn vermeld, zijn per positie volledig uitwisselbaar met de halfgeleiders in het apparaat, ongeacht de typeaanduiding op deze halfgeleiders.

Avvertimenti

- Le prescrizioni di sicurezza richiedono che l'apparecchio sia ricondotto alle condizioni originali e che siano usati ricambi originali.

Componenti di sicurezza sono marcati con 

- Tutti gli IC e semiconduttori sono sensibili a scariche elettrostatiche (ESD). Non curanze durante la riparazione di semiconduttori possono danneggiarli o condurre ad una riduzione drastica della durata. Durante la riparazione assicurarsi di essere collegati allo stesso potenziale attraverso un bracciale di protezione contro scariche elettrostatiche. Inoltre tenere anche tutti i componenti e gli attrezzi a questo potenziale.
- Apparecchi da riparare bisogna collegarli sempre via un trasformatore isolante (separatore) alla tensione normale.
- Non scambiare moduli o altri componenti quando l'apparecchio è in funzione.
- Per l'accordo usare soltanto attrezzi di plastica (non usare attrezzi metallici). Così si evitano cortocircuiti e collegamenti instabili.

Osservazioni

- Misurare le tensioni continue e gli oscillogrammi riferendosi alla massa dell'apparecchio.
ECCEZIONE
Le tensioni continue e gli oscillogrammi dall'alimentatore sono misurati sulla parte primaria contro GND-Live.
- Le tensioni continue e gli oscillogrammi indicati negli schemi di collegamento devono essere misurati secondo le condizioni seguenti: segnale barre colore, portante dell'immagine su: 503.25 MHz (C25).
- Gli oscillogrammi e le tensioni continue sono misurati in RECORD o PLAYBACK.
- I componenti indicati nelle liste sono intercambiabili con quelli nell'apparecchio nonostante l'eventuale denominazione di modelli.

Avisos

- Las instrucciones de seguridad exigen que después de la reparación el aparato se encuentre en el estado original y que las piezas de repuesto, utilizadas para la reparación, sean idénticas a las originales.

Los componentes de seguridad están marcados con 

- Todos los IC y semiconductores son sensibles a descargas electrostáticas (ESD). Un tratamiento no conforme a las instrucciones de semiconductores en caso de reparación, podría llevar a la destrucción de estos componentes, o a una reducción drástica de la duración. Tenga cuidado de que, en caso de reparación, estar al mismo potencial que la masa del aparato, por una pulsera con resistencia. Ponga todos los componentes, herramientas y recursos al mismo potencial.
- Para reparar un aparato hay que conectarlo siempre a la alimentación a través de un transformador de aislamiento.
- Cuando un aparato está en marcha no pueden ser cambiados módulos u otras piezas de repuesto.
- Para los ajustes hay que utilizar exclusivamente herramientas de plástico (nunca herramientas metálicas). Así se evitan cortocircuitos y circuitos inestables.

Notas

- Hay que medir las tensiones continuas y los oscilogramas contra la masa del aparato.
EXCEPCION:
Las tensiones continuas y los oscilogramas de la fuente de alimentación son medidos en la primaria contra GND-Live.
- Las tensiones continuas y los oscilogramas mencionados en los esquemas tienen que ser medidos de manera siguiente: señal barra de color portadora de imagen en 503.25 MHz (C25)
- Los oscilogramas y las tensiones continuas son medidas en „RECORD“ y „PLAYBACK“
- Los componentes mencionados en las listas se los puede cambiar por los componentes en el aparato, a pesar de eventuales designaciones de tipos.

(GB)

TECHNICAL DATA

Mains voltage
Mains frequency
Power consumption
Ambient temperature
Relative humidity
Dimensions
Weight
Fast forward/rewind time
Position of use
Video resolution
Audio

(D)

TECHNISCHE DATEN

Netzspannung
Netzfrequenz
Leistungsaufnahme
Raumtemperatur
Relative Luftfeuchtigkeit
Abmessungen
Gewicht
Vor-/Rückspulzeit
Betriebslage
Video-Auflösung
Audio

(F)

CARACTERISTIQUES

Tension secteur 220 - 240 V
Fréquence 45 - 65 Hz
Puissance absorbée 12,5 W
Température ambiante +10°C to +35°C
Humidité relative 20 - 80 %
Encombrement 380 x 86 x 339 mm
Poids ~4,6 kg
Temps (re-)bobinage typ. 260s (E180 cass.)
Position d'emploi horizontally, max. 15°
Puissance absorbée >234 lines
Audio SP: 80Hz - 10kHz (≤8dB)
Audio LP: 80Hz - 5kHz (≤8dB)

(NL)

TECHNISCHE GEGEVENS

Netspanning
Netfrequentie
Opgenomen vermogen
Omgevingstemperatuur
Relatieve vochtigheid
Afmetingen
Gewicht
Vooruit/terugspoeltijd
Gebruikspositie
Oplossend vermogen
Audio

(E)

DATOS TECNICOS

Tensión de red
Frecuencia de red
Consumo de potencia
Temperatura ambiente
Humedad relativa
Dimensiones
Peso
tiempo de (re-)bobinado
Posición de uso
Resolución video
Audio

(I)

DATI TECNICI

Tensione di alimentazione 220 - 240 V
Frequenza di rete 45 - 65 Hz
Potenza assorbita 12,5 W
Temperatura ambiente +10°C to +35°C
Umidità relativa 20 - 80 %
Dimensioni 380 x 86 x 339 mm
Peso ~4,6 kg
Tempo di (ri-)avvolgimento typ. 260s (E180 cass.)
Posizione di funzionamento horizontally, max. 15°
Risoluzione video >234 lines
Audio SP: 80Hz - 10kHz (≤8dB)
Audio LP: 80Hz - 5kHz (≤8dB)

Front of video recorder

STANDBY Standby switch

EJECT. Cassette eject

◀◀ Rewind/Reverse scanning

▶▶ Forward wind/Forward scanning

SET CLOCK Set clock

SEARCH Channel search

STORE Store TV channel

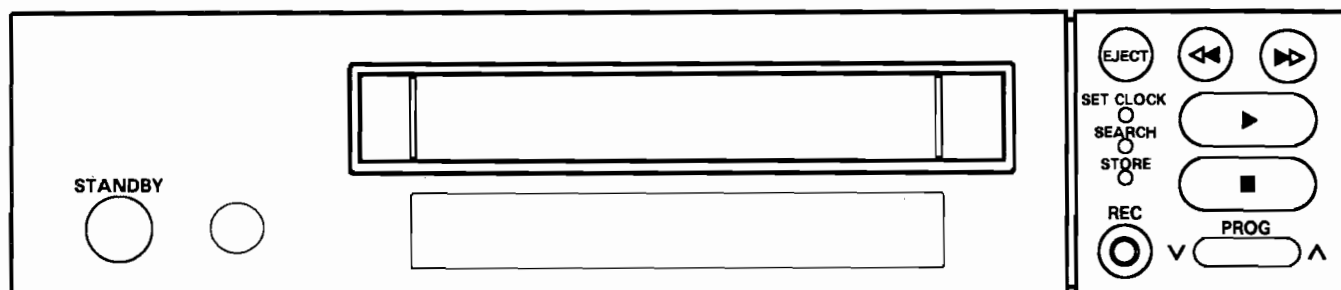
▶ Playback

■ Pause/Stop

REC. Record

▼ Down/Minus, programme number

▲ Up/Plus, programme number



Back of video recorder

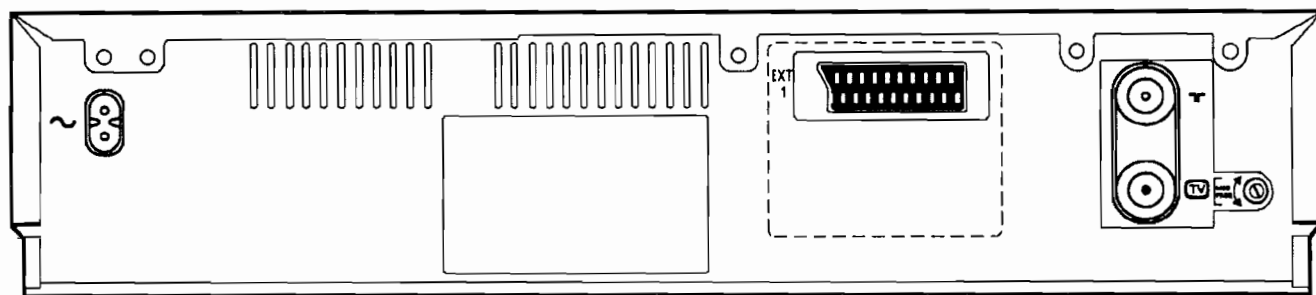
⏏ Aerial input socket

TV Aerial output socket

~ Mains socket

EXT 1 Scart (AV-Euro) socket

MOD. FREQ. Channel control

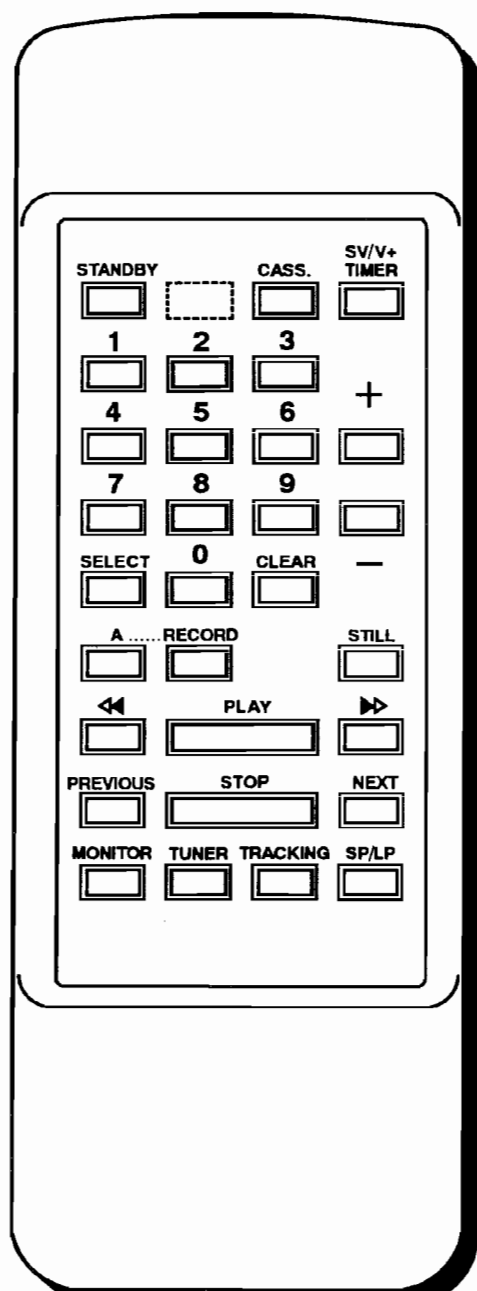


1. SUMMARY OF BUTTONS AND CONTROLS

Here is a list of the buttons, controls and sockets that you will use on the set and the remote control.

You will find detailed descriptions of the various functions in the relevant chapters.

The remote control



STANDBY Standby switch

SV / V+ TIMER TIMER programming on the video recorder

0-9 Digit buttons 0-9

SELECT Function selector

CLEAR Reset/clear

+ Up/Plus, programme number

- Down/Minus, programme number

A Activate record button

RECORD Record (**A** and **RECORD** buttons simultaneously)

STILL Still picture

◀◀ Rewind/Reverse scanning

PLAY Playback

▶▶ Wind/Forward scanning

STOP Stop

MONITOR TV monitor function

TUNER Tuner mode

TRACKING Tracking

Buttons that are not described in the list have **no** function.

FAULT LOCATING HELP FUNCTIONS

2. Service test program

2.1 Introduction

A service test program has been integrated in the software program of the operating and deck microprocessors. The service test program consists of the following functions:

- Display of mask numbers and operating and deck software versions
- Control of drive sensors
- Control of drive functions
- Operating hours counter
- Recorder initialization (Option Code)
- Endurance test

2.2 Activating the service test program

Press STOP button on remote control and keep pressed. Then press PLAY button on recorder and hold down for at least 5 sec. Whilst pressing the PLAY button on the recorder, the STOP button on the remote control can be released.

The display shows information similar to paragraph 2.3 (Fig. 1).

The next service step is selected with the OK, SELECT, or VPS button (depending on the remote control).

The service test program can be activated in any recorder operating state with the exception of the station search, install, timer adjustment and tape length selection modes. During the service mode the recorder is fully operational in all drive functions. To quit the service test program press the STAND BY button or disconnect recorder from mains.

2.3 Display information

(µP's and mask numbers)

Alphanumeric display: *

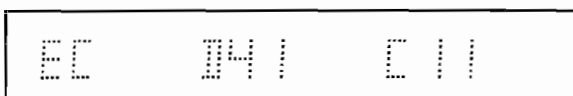


Fig. 1a

Numerical display: *

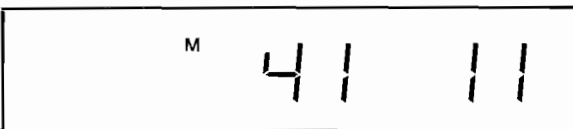


Fig. 1b

* Display can differ from one model to another.

The two first digits show:
(for alphanumeric display only)

Version	
EC	ECO
PH	Philips
BR	Brands/OEM

The next digits show the deck mask assignment and the mask number.

Deck mask	Version
ECO Mono	D4x
ECO Stereo	D5x
Standard without Swing Search	D3x
Standard with Swing Search	D6x

(Display : D = Deck mask for alphanumeric display only
41 = ECO MONO mask 1)

The last two digits show the operating mask assignment and mask number

Control mask	Version
ECO Mono	C1x
ECO Stereo	C2x
ECO /05 Autoinstall	C3x
PH Standard without PDC	C1x
PH Standard with PDC	C2x
BR Standard without PDC	C1x
BR Standard with PDC	C2x

(Display : C = Control mask for alphanumeric display only
11 = ECO-Mono mask 1)

2.4 Drive sensor control

The next service step is selected with the OK, SELECT, or VPS button (depending on the remote control).

The drive sensor control display contains four digits. One digital position shows several sensors. For each operated sensor the display value changes.

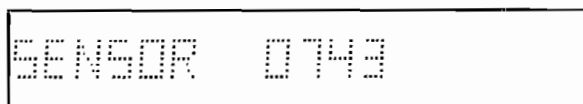


Fig. 2a

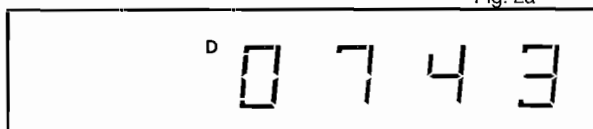


Fig. 2b

The first two digits show the drive position,
(e.g.: 07 = Eject)

Status	Position (FTA dec)	Display (hex)
Eject	7 +2/-2	07 +2/-2
Index/wind/rewind	94 +0/-2	5E +0/-2
Stop out	100 +3/-0	64 +3/-0
Play	214 +2/-2	D6 +2/-2
Reverse	237 +2/-0	ED +2/-0

The last two digits show the drive sensors:

Bit	Sensor	Bit	Sensor
0	tape end	4	tacho left (not for ECO)
1	tape begin	5	init switch
2	record protection	6	threading tacho
3	tacho right	7	not used (0)

The display output of the bits is hexadecimal in two bytes, of which bit 7 is not assigned (0).

(0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F).

Example (Eject):

(X = depending on tacho position 1 or 0)

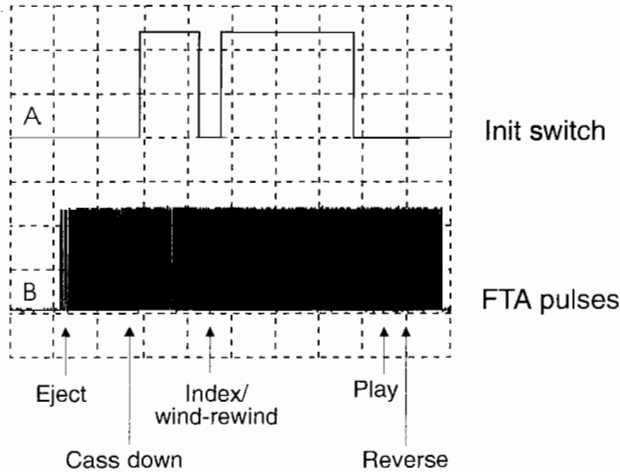
Bit	7	6	5	4	3	2	1	0
Value	0	X	0	0	X	0	1	1
Display		4	or	0		B	or	3

Functioning of Init switch:

The diagram shows the functioning of the init switch, depending on the drive position. The number of FTA pulses is important for the drive position.

A: DC, 2 V/Div, 0.5 s/Div

B: DC, 2 V/Div, 0.5 s/Div



2.5 Control of drive functions

2.5.1 Threading and unthreading time

The signal of the photoelectric barrier controlling the revolutions of the threading motor is used as reference for the threading and unthreading time.

2.5.2 Stopping of left or right winding disk

The tacho signals of the left (WTL) and right (WTR) winding disks are used as control reference.

2.5.3 Stopping of axial head motor

This is monitored with the PG/FG signal. The signal is discharged from the e.m.f. of the non-conducting spools of the axial head motor, showing the position of the head cylinder.

2.5.4 Capstan motor fault

This is monitored with the FGD signal.

If one of the above sensor signals is not available the recorder tries to put the lift in the "EJECT" position.

2.6 Explanation of deck fault codes and deck fault status

The last occurred fault code is stored and remains in the EEPROM even if the recorder is disconnected from the mains.

The fault code can be erased by pushing the CLEAR button on the remote control during the service mode.

2.7 Drive condition

The next service step is selected with the OK, SELECT, or VPS button (depending on the remote control).

The FTA signal arriving from the photoelectric barrier controlling the threading motor revolution is used to monitor the drive condition.

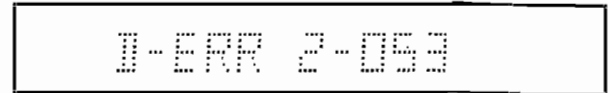


Fig. 3a

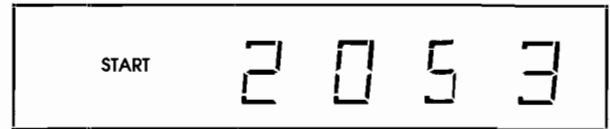


Fig. 3b

The first digit is the deck fault code:
(e.g.: 2 = Capstan fault)

The fault code can be reset with the CLEAR command.

0	no error
1	threading error
2	no capstan pulses
3	tape broken
4	no pulses left reel (not for ECO)
5	no pulses right reel
6	head motor error

The last three digits show the deck fault condition:
(e.g.: 053 = during Play)

012	Standby	046	Scan forward	215	Slow 7
045	Eject on	044	Scan reverse	212	Slow 10
054	Stop	052	Wind	211	Slow 14
041	Still	050	Rewind	196	Tuner eject
053	Play	048	Pause	197	Standby eject
125	Tuner	047	Reverse	112	Index next
055	Record	042	Fast forward	113	Index previous
014	Play+ Tracking	031	Fast reverse		

2.8 Operating hours counter

The next service step is selected with the OK, SELECT, or VPS button.

The step shows how many hours the head disc has rotated. The display contains four digits.

e.g.: 1234 operating hours

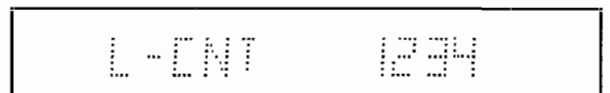


Fig. 4a

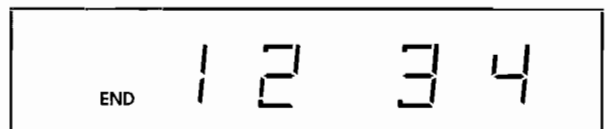


Fig. 4b

2.9 EEPROM

2.9.1 Erasing the EEPROM

- Disconnect from mains
- Keep WIND and REWIND buttons pressed and reconnect to mains.

All data is then erased from the EEPROM and initialized (Timer and Options). Also the internal processor RAM is erased.

2.9.2 Initialization of EEPROM

If a new EEPROM is installed as part of repair work, it must be newly initialized.

Step 1:

Activating the service test program.

Press STOP button on remote control and keep pressed. Then press PLAY button on recorder and keep pressed for at least 5 sec. Whilst pressing the PLAY button on the recorder, the STOP button on the remote control can be released.

Display shows for instance:

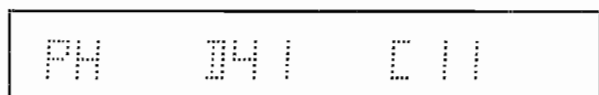


Fig. 5a

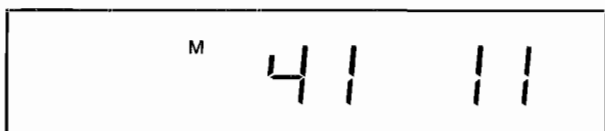


Fig. 5b

Step 2:

Activating the option code input.

Press STOP button on remote control and keep pressed. Then press PLAY button on recorder and keep pressed for at least 5 sec. Whilst pressing the PLAY button on the recorder, the STOP button on the remote control can be released.

By inputting a three digit decimal code (see code table) the correct features are set. The input can be erased by pressing the CLEAR button on the remote control.

The display shows the following information :

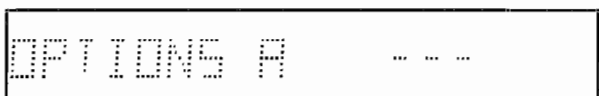


Fig. 6a

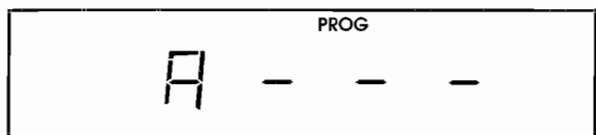


Fig. 6b

Step 3:

The next input step is selected with the OK, PROGRAM PRESET or STORE button (depending on the remote control).

To check the input code, it is shown in hexadecimal form on the display for approx. 2 sec. (see code table) before the next step is activated. The activation is only possible in ascending order, a return to a previous step is not possible. An incorrect code input requires a restart from option A.

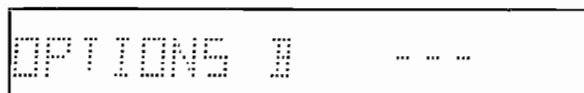


Fig. 7a

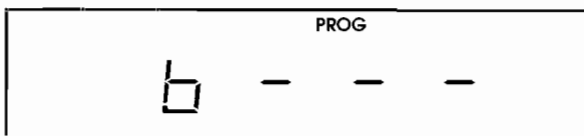


Fig. 7a

Step 4: (as step 3)

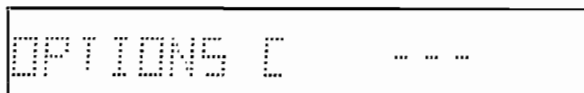


Fig. 8a

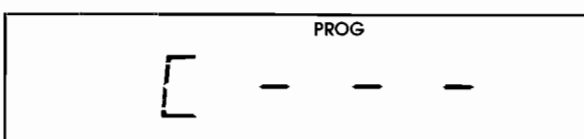


Fig. 8b

Step 5: (as step 3)

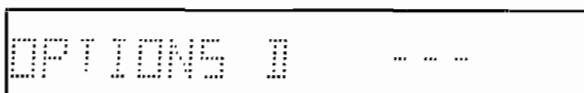


Fig. 9a

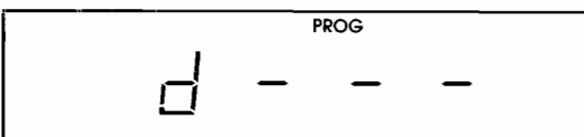


Fig. 9b

Step 6: (as step 3)

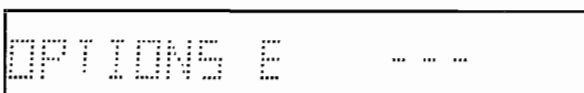


Fig. 10a

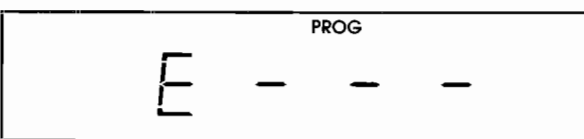


Fig. 10b

Step 7: (as step 3)

After the last input (E) the mask information appears again on the display (Fig. 5).

Check the inserted code:

Begin with step2 and press STORE. The display show for approx. 2sec. the optioncode A in hex (see code table); press STORE again, the display show optioncode B for approx. 2sec. a.s.o.

To quit the service test program press the STAND BY button.

2.10 Endurance test

A recorder endurance test can be carried out in the service test program. For this purpose, insert tape and set recorder to "PLAY", "REC" or "REWIND" position. The functions are then continuously carried out. This test serves to detect intermittent faults. The last occurred fault is stored in the EEPROM (it remains stored even in case of power failure).

The endurance test is terminated by quitting the service test program.

Option - list

	OPTION A		OPTION B		OPTION C		OPTION D		OPTION E	
	decimal input	hexa - decimal check	decimal input	hexa - decimal check	decimal input	hexa - decimal check	decimal input	hexa - decimal check	decimal input	hexa - decimal check
BV-245 EC	000	00	000	00	000	00	064	40	001	01
BV-245 EGC	000	00	000	00	001	01	064	40	001	01
BV-245 OIRT	000	00	000	00	001	01	069	45	129	81
BV-445 OIRT	000	00	000	00	001	01	069	45	151	97
RTV-205 PSW	001	01	000	00	000	00	067	43	001	01

SERVICING OF SMDs (Surface Mounted Devices)

1. General cautions on handling and storage.

Oxidation on the SMDs terminals results in poor soldering. Do not handle SMDs with bare hands.

Avoid for storage places that are sensitive to oxidation such as places with sulfur or chlorine gas, direct sunlight, high temperatures or a high degree of humidity. As a result the capacitance or resistance value of the SMDs may be affected.

Rough handling of circuit boards containing SMDs may cause damage to the components as well as the circuit boards. Circuit boards containing SMDs should never be bent or flexed. Different circuit board materials expand and contract at different rates when heated or cooled and the components and/or solder connections may be damaged due to the stress. Never rub or scrape chip components as this may cause the value of the component to change. Similarly, do not slide the circuit board across any surface.

2. Removal of SMDs

Heat the solder (for 2-3 seconds) at each terminal of the chip. Small components can, by means of litz wire and a limited horizontal force, be removed with the soldering iron. They can also be removed with a solder sucker (see Fig. 1A) or

While holding the SMD with a pair of tweezers take it off gently using the soldering iron's heat applied to each terminal (see Fig. 1B).

Remove the excess solder on the solder lands by means of litz wire or a solder sucker (see Fig. 1C).

Caution on removal :

When handling the soldering iron, use suitable pressure and be careful.

When removing the chip, do not use undue force with the pair of tweezers.

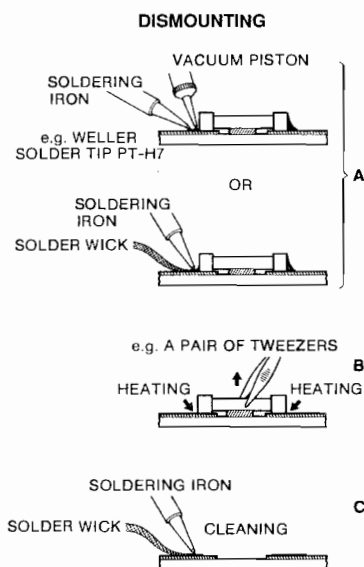


Fig. 1

The soldering iron to be used (approx. 30 W), must preferably be provided with a thermal control (soldering temperature about 225 to 250°C).

The chip, once removed, must **never** be used again.

3. Attachment of SMDs

Locate the SMD on the solder lands by means of tweezers and solder the component at one side. Ensure that the component is positioned well on the solder lands (see Fig. 2A).

Next complete the soldering of the terminals of the component (see Fig. 2B).

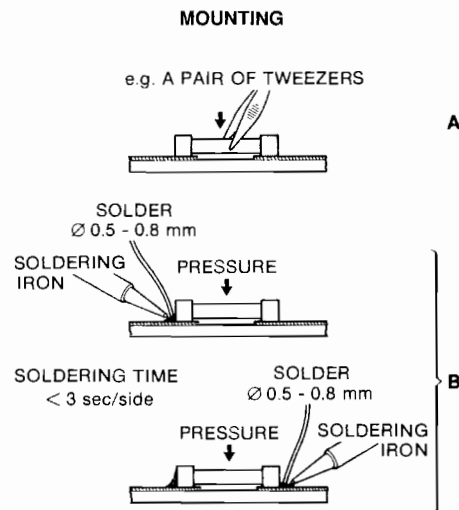


Fig. 2

Caution on attachment :

When soldering the SMD terminals, do not touch them directly with the soldering iron. The soldering must be as quick as possible; care must be taken to avoid damage to the terminals and the body itself.

Keep the SMD's body in contact with the printed board when soldering.

The soldering iron to be used (approx. 30 W) must preferably be provided with a thermal control (soldering temperature about 225 to 250°C).

Soldering should not be done outside the solder land.

Soldering flux (of rosin) may be used but should not be acidic.

After soldering, let the SMD cool down gradually at room temperature.

The quantity of solder must be proportional with the size of the solder land. If the quantity is too great, the SMD might crack or the solder lands might be torn loose from the printed board (see Fig. 3).

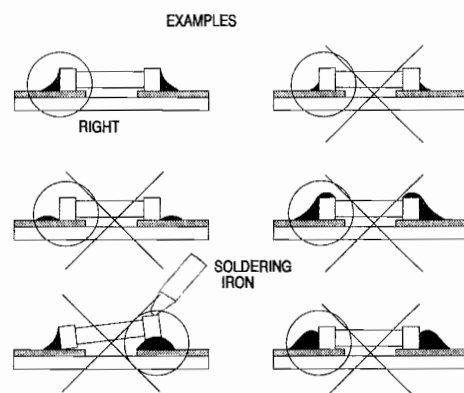
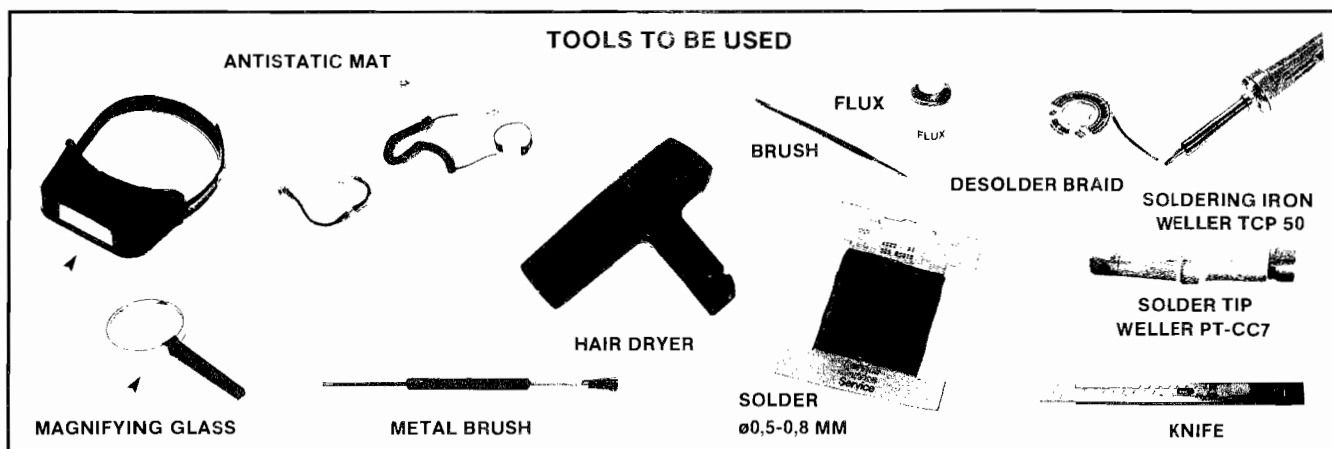


Fig. 3

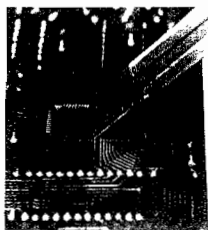
FLATPACK REPLACEMENT



DISMOUNTING



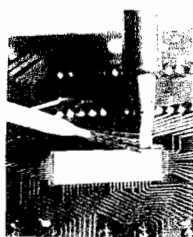
CUTTING
THE LEADS



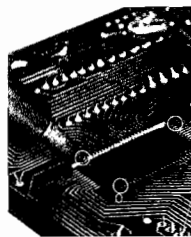
WRONG
TRACKS WILL
BE DAMAGED



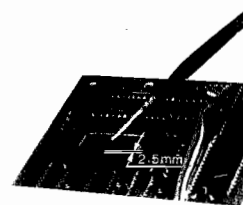
CLEANING
THE TRACKS



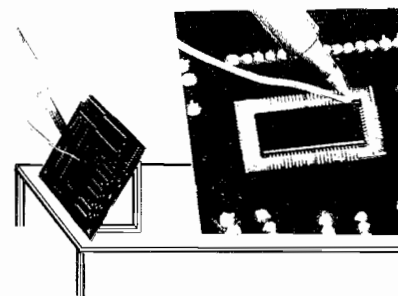
MOUNTING



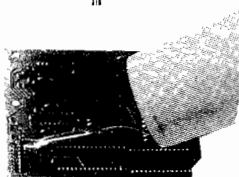
FIXING IC
AT THE CORNERS



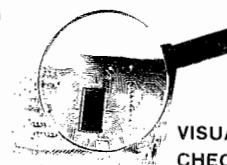
APPLYING FLUX



SOLDERING:
SPEED
1 CM IN 5 SEC.

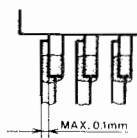


DRYING

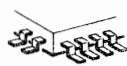


VISUAL
CHECK

ALIGNING THE LEADS



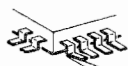
RIGHT



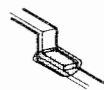
WRONG



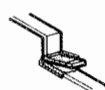
WRONG



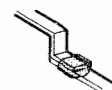
SOLDERING



RIGHT



WRONG



WRONG

Removal of case components and service positions of printed circuit boards

1. The casing cover

Dismounting :

- Unscrew the screws A, B, C, D, E, F and G (see fig. 1).
- Pull back the casing cover for appr. 1 cm, and when the side panels are being slightly pressed outward, the cover can be taken off.

Assembly :

- Place the front groove tightly on the front panel.
- Then carry out the assembly in reverse order.

2. The bottom plate

- Place the unit with the bottom side up.
- The bottom plate can be lifted off by releasing the six snap hooks (see fig. 2).

3. The front panel

- Remove the casing cover (see point 1).
- Press the two snap hooks on the left and the two snap hooks on the right at the front outward.
- Press the front at the top slightly forward, release the 3 snap hooks at the bottom side of the front and pull forward (see fig. 3).

Note :

For assembly, the front panel has to be slipped on in parallel to the control print. For this purpose, the lever which serves to open the lift flap has to be pushed into the flap guide.

4. Power supply NSM

The NSM can be removed from the unit by releasing the two snap hooks (see fig. 4).

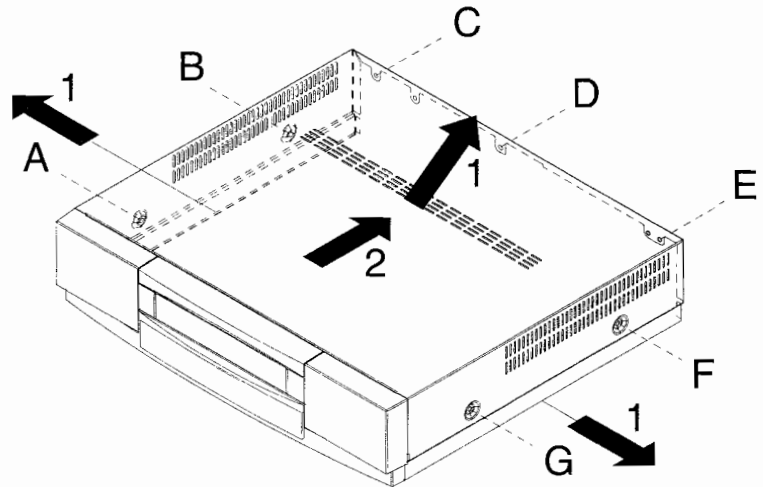


Fig. 1

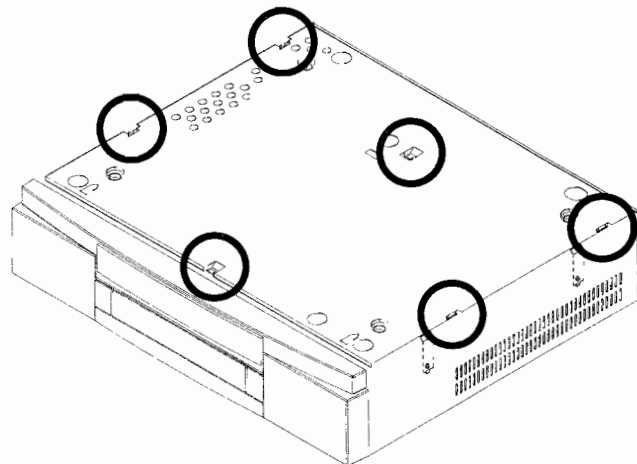


Fig. 2

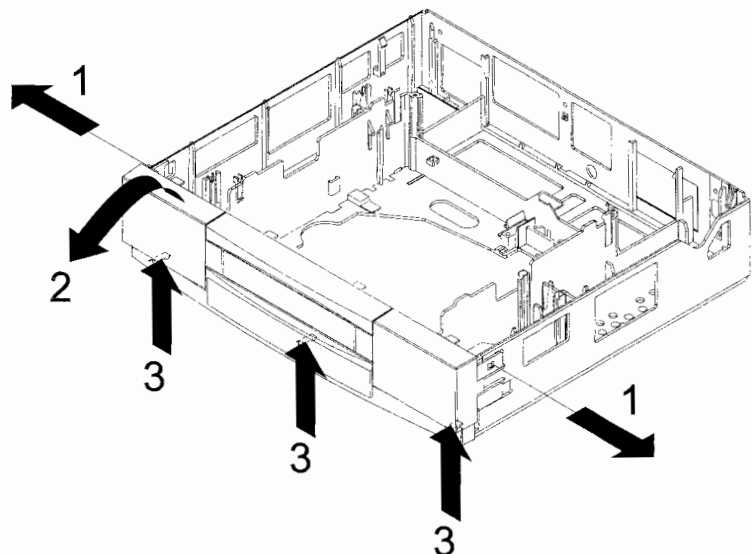


Fig. 3

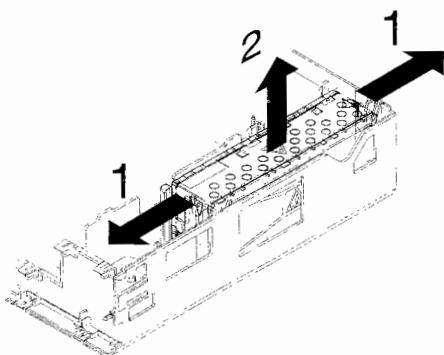


Fig. 4

5. Control print ODC

- Remove the front panel see point 3.
- The control print can be removed by releasing the snap hooks (see fig. 5).

6. Family board OFB

- Release the 4 snap hooks (see fig. 6).
- Now lift the OFB turn it into the service position (see fig. 7) and place it into the slots provided.

7. The Tape deck

- Remove front panel and cover, see point 1 and 3.
- Unlock the 2 lift locks and manually move the lift 5 cm to the rear.
- Unscrew the 3 screws V,R,S (see fig. 8).
- The whole tape deck can now be removed from the frame.

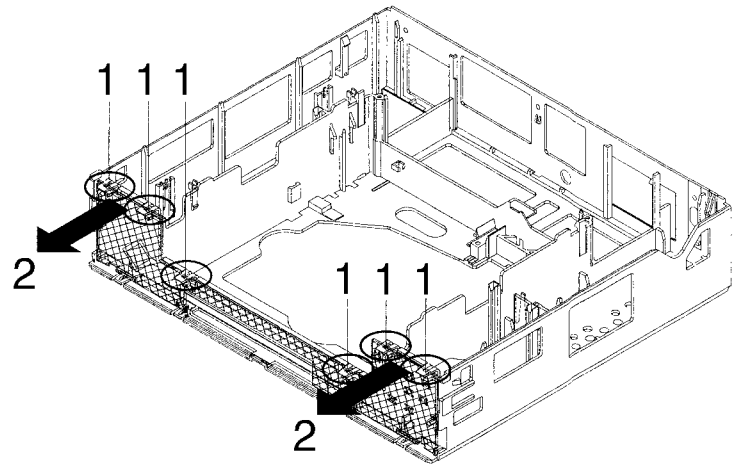


Fig. 5

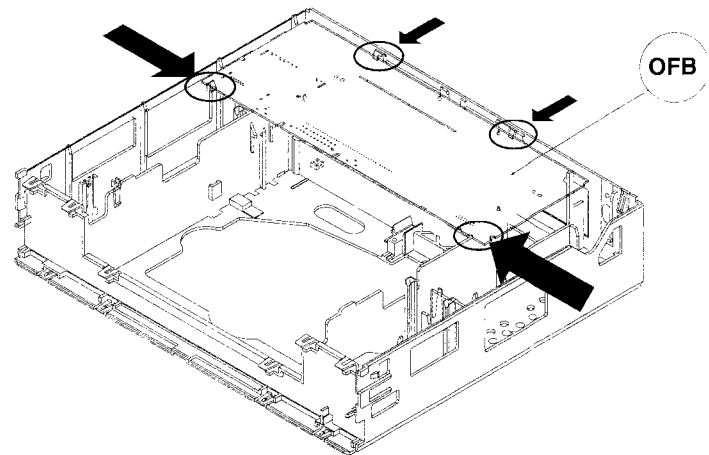


Fig. 6

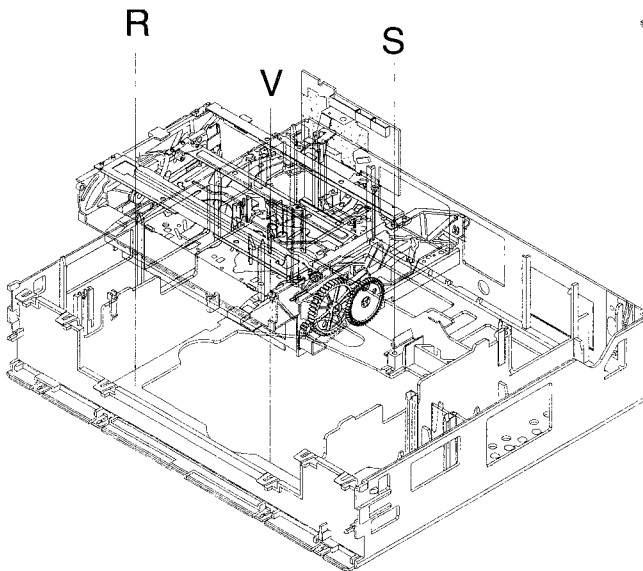


Fig. 8

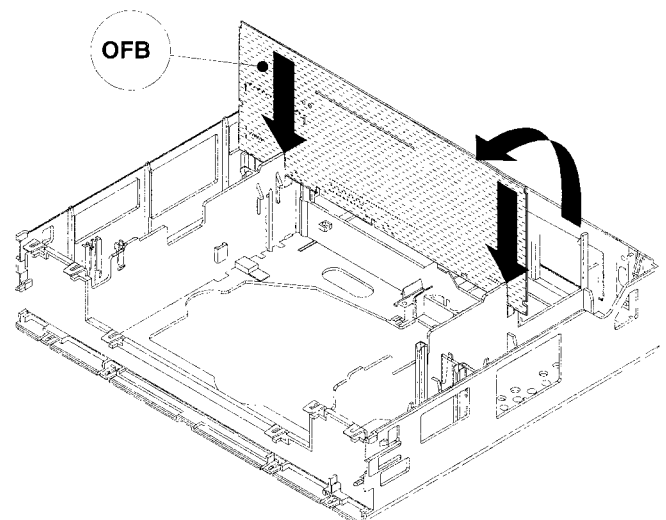


Fig. 7

Circuit descriptions

ODC Control UNIT

The microcomputer IC7101 is the heart of the control unit and takes over the following functions with the respective function groups:

- Evaluation of the keyboard matrix.
- Decoding of remote control commands from the infrared receiver IC7103.
- Quartz clock
- Integrated RAM for storing timer data
- Display control
- Bi-directional serial interface for the data exchange between operator and sequence control computer.
- I²C bus interface (SDA - pin 79, SCL pin 23) to EEPROM, IC7412 on the motherboard. It is also used as serial data bus output in connection with STROBE pin 27.
- Generation of tuner tuning voltage by pulse-width modulation at pin 80 (5V level) for coarse tuning with 8-bit resolution (VST sets).
- Generation of tuner fine tuning voltage with 6-bit resolution and band selection (2 bit) in connection with serial interface SDA, SCL and STROBE (VST sets).
- The drifting of the tuner or the aerial signal generates the AFC control voltage in the reception circuit on the motherboard. This voltage is supplied to pin 78 and the operator computer readjusts the tuner tuning voltage.
- In case of power failure the backup cell at pin 33 supplies the clock and the RAM depending on the model for 10s (C2999, 470 µf electrolytic capacitor) or for 7 h (C2998, 220 mF gold capacitor). The diode D6099 prevents the C2999/C2998 from discharging. During this period a LOW level exists at pin 2 so that further functions of the IC are switched off by the system quartz Q1001 at pin 13 / 14.

Switched-mode power supply NSM1 (PS)

Typical data :

Mains voltage:	196 - 265 V _{rms}
Max. power:	40 W
Switching frequency:	30-220 kHz
Efficiency:	78% at max. load
All outputs are short circuit protected	

1. Functional description (blocking oscillator principle) :

During the forward phase of the switching transistor energy is transferred from the mains to the transformer. During the blocking phase this energy is supplied to the load. Using the switch-on time, the energy transferred in each cycle is regulated so that the output voltages are not affected by load or input voltage variations. The power transistor is controlled by integrated circuit TDA4605 or SPH4690, [Y7005/7007].

2. Description of different load conditions :

No-load operation :

The SMPS operates in **burst mode**, i.e. it starts up (relative long delay time) and is switched off by the IC after a few cycles as the output voltage becomes too high. After the fall of the output voltage the SMPS will start again.

Control range :

The switching frequency is reduced with increasing load. The duty factor is mainly controlled by the mains voltage. The output voltage is only insignificantly load dependant.

Reversal point :

At this point of the output characteristics maximum power is transferred.

Overload :

The power supply also operates in **burst mode**. The energy in each cycle is limited so that the output voltage is reduced.

3. Circuit description :

The supply voltage is filtered by a filter around spool [5050], rectified by bridge rectifier [6070] and filtered by [2070]. [2030] is loaded via [3052, 3054, 3056, 3058] and serves as voltage supply for IC [Y7005/Y7007] during the start-up phase. After the start-up transformer windings 1-9 take over the supply via [6027].

The power transistor BUK455-60[Y7007]/[7035 external] is the switching transistor of the power supply. The inductivities of primary windings 6-7 determine the system frequency of the circuit. During the forward phase current will flow from the positive supply voltage through the transformer's primary winding and the transistor to ground. As the positive voltage at pin 7 of the transformer is constant (for this example), the current rises linearly creating a ramp depending on the mains voltage and the inductance of the primary winding. A certain amount of energy is stored in the transformer in the form of a magnetic field. The secondary voltage is of such polarity that the diodes are non-conducting.

Capacitor [2015] is loaded, creating a saw-tooth voltage representing the primary current. At the same time the voltage is checked and the switching transistor is turned off when the voltage reaches a certain value depending on the regulating voltage on pin 1 of the IC. The dimensioning of [2015] and [3011] ensures that the transformer core will not be saturated.

When the switching transistor is switched off, energy is no longer supplied to the transformer. The inductance of the transformer now strives to maintain the current which has been flowing through it at a constant level ($u=L \cdot di/dt$). Consequently the polarity of the transformer voltages reverses causing a current to flow through the transformer's secondary winding via the diodes, electrolytic capacitors and the load. This current is also ramp shaped (but decreasing).

After all the energy stored in the transformer has been supplied to the load and the magnetic field has disappeared, the voltages from the secondary windings fall below the output voltages - maintained constant by the electrolytic capacitors - and the threshold voltage of the diodes. Consequently the current stops in the secondary windings. At this point the drain-source voltage of the switching transistor is not yet zero as capacitor [2060] contains a certain charge. This charge commences a cosine-shaped discharge determined by the transformer's self-induction. Once this discharge passes through zero the TDA4605[Y7007]/[7005] detects this at pin 8/18. The switching transistor is now switched on again and a new cycle starts.

The switching power supply is regulated by altering the conductive time of the switching transistor so that either more or less energy is transferred from the mains to the transformer. The control information stems from reference component [7085] which monitors the output voltage of the switching power supply. This output voltage is fed to pin 1 of TDA4605[Y7007]/[7005] via an optocoupler (for electric isolation). TDA4605[Y7007]/[7005] compares the voltage to an internal reference.

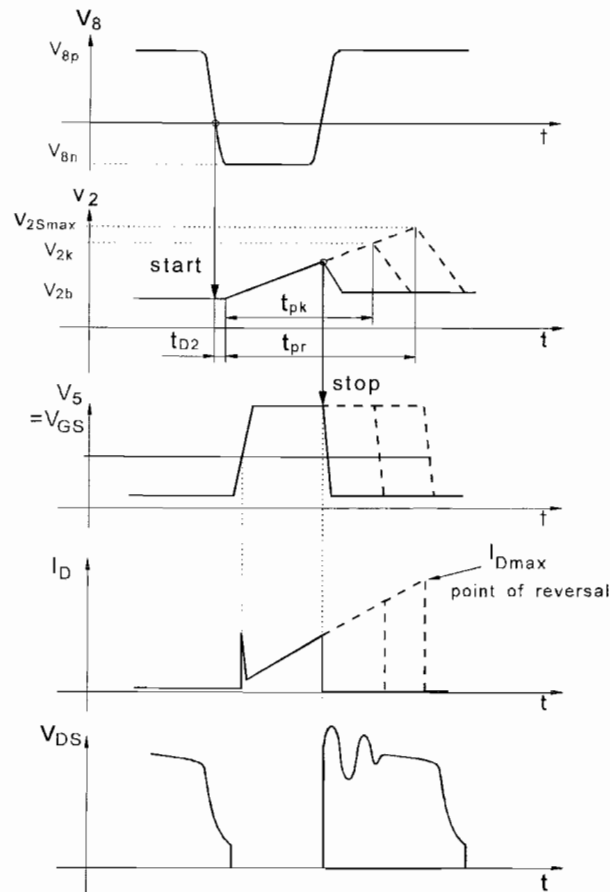


Fig. 1

The resulting value shifts the level with which the voltage is compared at pin 2 of the IC (the image of the primary current). [7085] is a reference element with an internal 2.5 V reference voltage and a compare circuit.

[3040, 3042, 3044, 2040] and [6040] form a snubber network limiting the peak voltage at switch-off.

The ringing occurring in both voltages and currents is caused by stray selfinductances in the transformer. Therefore a passage through zero at pin 8[18] of TDA 4600[Y7007]/[7005, pin 8] will be ignored after the switching transistor has been switched off (4μs internally fixed).

The voltage of pin 3 of TDA4605[Y7007]/[7005] is required for the reversal point current serving as additional correction current for capacitor [2015]. This current shortens the on-time of [Y7007]/[7035 external!]. The reversal point is also stable at higher mains voltage.

The protective circuit at pin 7[17] is an IC option. Using [2023] the start-up phase is carried out with shortened pulses so that the switching frequency is beyond the audible range.

On the secondary side 5 voltages are available, rectified by [6155...6180] and filtered by [2102-2185].

[Y5123...5184] are RF-filter coils which block disturbances caused by clock frequencies of μPs.

Description of "start-up phase" :

After connection to the mains the following voltages are increasing at the pins of [Y7007]/[7005] at time t_0 (see Figure 2):

- V_6 corresponding to a half wavelength charge via [3058,3056,3054,3052]
- V_2 to V_{2max} (typical 6,6 V)
- V_3 to the fixed value of voltage divider [3005, 3007]

Start-up phase/ short circuit operation of TDA4605

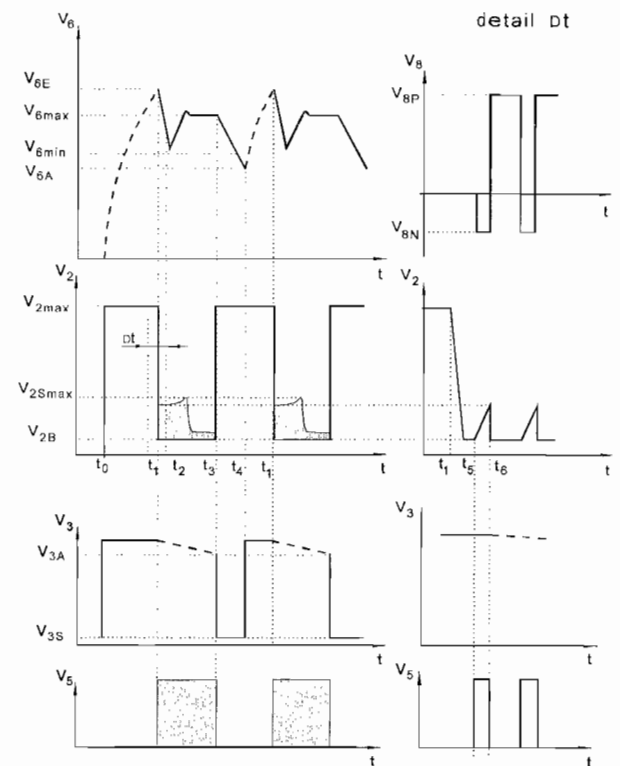


Fig. 2

The current consumption is in this case [0,8] mA. The internal reference voltage of the IC is switched on at time t_1 ; if $V_6 = V_{6E}$. The current take-up rises to 12 mA max. The primary current to voltage converter controls $V_2 = V_{2B}$ and at time $t_5 - t_6$ a starting pulse is generated at p in [15/5]. The feedback at pin [18/8] starts the next pulse and so on.

The feedback at pin 8[18/8] starts the next pulse and so on.

All pulses, start-pulse included, are pulse width controlled by the regulation voltage at pin 1. This voltage corresponds to a short circuit situation.

The start up is triggered by "short circuit pulses" being extended depending on the regulation voltage.

At time t_2 the maximum pulse width occurs ($V_2 = V_{2Smax}$). TDA4605[Y7007]/[7005] is now in the reversal point. V_2 peaks decrease rapidly as the circuit is within the regulation range. The regulation-loop is locked.

If V_6 drops below the limit value V_{6min} before reaching the reversal point, the start-up will be stopped (pin [15/5] is switched off) and V_6 decreases to V_{6A} - the IC is switched off. At time t_4 V_6 rises by a half wavelength charge - a new cycle starts.

4. Regulation-range, overload and no-load :

After start-up the IC is within the regulation range. A typical voltage at pin 1[1] is 400 mV. In case of an increasing secondary side load the switch-on time will also be increased. The peak voltage value at pin 2[2] also rises to V_{2Smax} . If the load increases further, the overload amplifier starts to reduce the pulse width of V5. This point is called "reversal point". The IC supply voltage V_6 behaves like the secondary voltage value. Consequently V_6 decreases with increasing load.

At condition $V_6 \ll V_{6min}$ TDA4605[Y7007]/[Y7005] changes to burst mode (polling operation mode). The short circuit power is small due to the time delay between the half wavelength start-ups being high. The overload amplifier reduces the pulse width to a certain value (tpk-mark). This minimum pulse width must be guaranteed as it is active in each start-up phase ($V_1=0$ V).

With decreasing load the pulse width is also decreased. The switching frequency is increased to the system frequency of the SMPS. If the output voltage is increased to $V_6=V_{6max}$, the logic will be blocked and the TDA4605[Y7007]/[Y7005] will be in burst mode. The SMPS works in open circuit operation.

Overtemperature :

The TDA4605[Y7007]/[Y7005] contains an overtemperature circuit blocking the logic if the chip temperature becomes too high. A renewed start-up is possible after cooling down.

Audio linear - AL

The signal input for Record or EE Mode is pin 11 of LA 7282. (ALC, automatic level control). At Record and EE the signal runs through a mute stage leaving the IC at pin 13. This is the output to the I/O section. The attenuator chain on pin 13 sets the necessary level for the ALC detector with its time constant on pin 10 and for the recording amplifier, with L 5601, R3616 and C 2613 forming the pre-emphasis components.

The recording amplifier output is pin 17. The recording current is added to the bias current and passed via the head to pin 2 where the switch is closed. In PB mode pin 1 is closed. The PB signal is amplified in the equalizing stage (time constant between pin 6 and pin 8) and is adjusted with R 3606. 3606 compensates amplifier and head sensitivity. The resistor 3601 and the capacitor 2600 determine the head resonance during PB.

In the LP mode the frequency characteristic is adapted by RC networks on pins 4, 5 and 15. The well-known circuit oscillating at approx. 70 kHz forms the erase oscillator for the erase heads and bias current. To avoid clicks, the oscillator must be switched on slowly (switching stage T 7604, time constant C 2617, R 3623, and current limiter R 3625).

Frontend - FV

The receiving part for /01 and /05 sets consists of the following blocks:

- 1.) Tuner
- 2.) IF amplifier and demodulator IC TDA 5950
- 3.) IF amplifier and demodulator IC TDA 9812
- 4.) AM demodulator IC TDA 9812

The Front End was designed for the reception of the following systems:

PAL B/G	=/01	
PAL I	=/05	
PAL B/G, SECAM D/K	=/59	not corresponding to EN55020
SECAM L,L'	=/19	
SECAM L,L', PAL B/G	=/39	
PAL B/G, SECAM D/K	=/59	corresponds to EN55020

The receiving section consists of the following blocks: Olivia ECO sets use tuners UV916E for /01, /19, /39 and /59 and U944C for /05, both with internal PLL.

1. Tuner and IF selection :

The intermediate frequency of the vision carrier is 38.9 MHz with the exception of SECAM L' for which the intermediate frequency of the vision carrier is 33.9 MHz. Consequently the AFC circuit has to be switched from 38.9 MHz to 33.9 MHz.

The surface wave filters for /19 and /39 have 2 Nyquist slopes. Consequently both signals with 33.9 MHz and 38.9 MHz-SC are correctly offered to the demodulator IC ([C77011], TDA9812).

2. IF amplifier and demodulator IC 5950 :

The IF out signal passes from tuner pin 17 via the SAW filter to the 3-stage IF amplifier TDA5950 [7772].

The Video IF wide-band amplifier supplies a quasi-synchronous demodulator for negative modulated IF signals. A separate video output pin 14 enables the use of one or more traps on the input of video switch pin 13.

The RF-AGC transfer point is defined by an adjustment controller at pin 2 to obtain a good signal-noise ratio and an optimum signal.

At pin 7 a demodulated video signal for descrambling is available. Pin 8 passes either the demodulated or external video.

The FM audio demodulator accommodates a frequency of 4.5 to 6.5 MHz. The demodulated audio output signal is provided to the following circuits via an output and input selection switch. The audio signal output at pin 19 is approximately 250 mV_{RMS} if an audio carrier with 1 kHz FM modulation and +/- 27 kHz stroke is applied.

The AGC voltage (pin 3) is fed to a respective input of the TVC micro controller which sends signal strength information to the microprocessor on the front panel. This is done to determine the sequence of programs to be stored in the autostore mode.

3. IF amplifier and demodulator IC TDA 9812:

For /19, /39 and /59 sets corresponding to EN55020 TDA9812 is used. To gain the respective selected IF signals these are determined for /39 and /59 by switachable filters.

The TDA 9812 is a PLL - type demodulator.

The built in VCO operating at the double vision carrier frequency is adjusted by the coil AFC-Adj.

The loop filter is connected to pin 5. The VCO voltage is used for generating the AFC voltage on pin 20.

The demodulated video signal passes via a 12 MHz low pass filter to pin 18 with a level of 1 V_{pp}. This level is controlled by an AGC circuit with an internal reference level. The sound carrier is then suppressed in the trap and the video signal amplified to 6 dB is then available at pin 8 with 2 V_{pp}.

The Sound IF is filtered in the bandpass pin 17 and passed to the input of the adjustment free FM PLL sound demodulator (pin 15). The audio signal output at pin 10 is approximately 350 mV_{RMS} if a carrier modulated with 1 kHz and +/-27 kHz FM modulation is connected.

The RF-AGC transfer point is defined by an adjustment controller at pin 4 to obtain a good signal-noise ratio and an optimum signal.

The AGC voltage (pin 25) is fed to a respective input of the TVC micro controller which sends signal strength information to the microprocessor on the front panel. This is done to determine the sequence of programs to be stored in the autostore mode.

4. AM demodulator IC TDA 9812 : (/39 only)

In case of SECAM L the amplitude modulated sound carrier (32.4 MHz) arrives at pin 2 of the SAW filter [1722] and returns filtered to the AM demodulator TDA 9812.

In case of SECAM L' the sound carrier is at 40.4 MHz due to the interchanged PC and SC.

The control signal SECAM BAND 1 (SB1) is diode switched to pin 1 of [1722] (40.4 MHz BPF).

The demodulated signal is passed to the integrated switch of TDA 9812, which selects between FM and AM sound pin 10 in multi-standard versions.

Video signal processing - VS

Switch-over functions of signal electronic IC LA7437:

REC/PB:

The switch between REC and PB mode is controlled by the 5 VPB voltage via pin 6 diode 6000.:

PB	> 3.8V
REC	< 3.8 V

NTSC/SECAM BG/PAL

The switching between colour systems (NTSC PB only) is triggered by the pin 30 voltage (INTSC):

NTSC	> 3.3 V
(ME-)SECAM B/G	= 1.8 ... 2.7 V
PAL	< 1.2V

SP/LP/SLP

The switching of speed modi (NTSC: SP/SLP, PAL/SECAM: SP/LP) is triggered by pin 25 voltage (LP):

SLP	> 3.3 V
LP	= 1.8 ... 2.7 V
SP	< 1.2 V

VIDEO INPUTTING

The artificial image pulse of the playback features and the test pattern for the set installation is input at pin 19 (FFP):

Loop through	< 0.8 V
Test pattern	= 1.2 ... 3.3 V
Artif. image pulse	> 3.7 V

COLOUR VECTOR

The colour vector is influenced with pin 27 (HSC2):

normal	< 1.2 V
LP features colour ()	= 2 ... 2.7 V
NTSC playback colour	> 3.9 V

FEATURE

Pin 39 (CKPAL) is set to > 3.9V in the feature modes.

Recording:

1. Luminance:

Pin 12 is the input of the video signal with $1V_{SS}$ (VBS). In the IC 7051 the video signal first passes through an amplification control (time constant determined by C 2023). From the AGC the signal path branches to be looped through by the signal electronics via the clamping, output amplification and emitter follower and for further signal processing in the signal electronic IC. The latter passes via a 6 dB attenuator, is clamped to a direct voltage level and passes via a 3.5 MHz low pass filter to the chrominance arrester and the vertical emphasis. This contains a 1H-CCD delay line in IC 7060 (passing via pin 20, returning via pin 18). Then the signal passes via an internal amplifier/impedance transformer and an external emitter follower (pin 4). The filter at the base of the emitter follower does not operate in the REC mode due to the low resistance of the emitter follower. The Y signal then passes through the detail enhancer, the linear and non linear pre-emphasis (time constant determined by the protective circuit of pins 6, 7, 8) and the white/dark clipping stage. The thus generated signal then directly controls the FM modulator. The Y FM signal leaves the IC 7051 via pin 2 and continues via an emitter follower and a low pass filter before being passed to the head amplifier print OHA 1910 as FMPV signal.

2 Chrominance PAL :

The chrominance signal is separated from the arriving video signal (pin 12) via a bandpass filter and continues via 2 switches to the ACC stage. The ACC amplifier stage controls the chroma amplitude for the successive stages (time constant via capacitor to pin 41). The chrominance signal is then passed to the main converter. The main converter mixes the 5.06 MHz - auxiliary carrier of the secondary converter with the 4.43 MHz chrominance signal to the 627 kHz output signal (to pin 38). The auxiliary carrier is a mixture of 4.43 MHz (the REC-APC, time constant to pin 33, compares quartz and burst frequency) and $(40+1/8) f_H = 627\text{kHz}$ (generated by $321f_H - VCO$, time constant pin 36/37 and phase rotation to VHS standard, control pin 17).

Via a band pass filter and the colour killer stage the converted chrominance signal arrives at pin 38 of the IC from where it is directly added to the Y-FM signal via an adjustment controller. The colour killer can either automatically identify the arriving signal (PAL yes/no) or can be activated by control line CKPAL at pin 39 (forced mode: PAL < 2.5 V, SECAM L > 2.5 V). The burst gate pulse is generated in the BGP generator depending on the sync separator and is output at pin 35. This signal is required by the SECAM (B/G) / MES detector (7070) to distinguish between an arriving PAL or SECAM B/G signal. The quartz oscillation (pin 32) serves apart for the chroma processing also to generate the clock frequency in the SEACM B/G detector (7070, pin 8) and that of Kombi-CCD (7060, pin 12).

3. SECAM B/G :

The signal path is nearly identical to the PAL path. The differences are:

- ◆ No phase rotation
- ◆ The filter characteristic of the chroma band passes becomes wider
- ◆ Free-running quartz frequency
- ◆ The SECAM B/G detector IC 7070 generates the triggering voltage at pin 30

4. SECAM L

Circuit description see OIO.

Playback:

1. Luminance:

The FM playback signal passes from the head amplifier print OHA (1919) as FMPV to the signal electronics. The signal is amplified and filtered by the FM processing and passes via pin 1 to the signal electronic IC 7051 where firstly the level of the envelope is regulated (FM-AGC, pin 10), limited by a double limiter and the signal is FM demodulated and filtered by a low pass filter. The demodulated Y signal still contains the recording pre-emphasis. This eliminates now the linear de-emphasis at the base of the emitter follower 7007. Furthermore the frequencies are peaked by approx. 2 MHz. The filter circuit is active as pin 4 becomes an open collector output in the playback mode whose load impedance depends on the de-emphasis/Peaking circuit. The Y signal is then clamped, filtered by a low pass filter and passed via the vertical noise canceller or dropout compensator. For this purpose the Y signal leaves the IC 7051 and is delayed in the IC 7060 by 1H (out at pin 20, in at pin 18). The CCD 1H delay line serves the Y signal as comb filter (vertical noise canceller) and as line store for the dropout compensation. Sequential circuit stages are: the non linear de-emphasis, the horizontal noise canceller and the picture control circuit to increase edge steepness (sharpness). The chrominance signal is then added to the luminance signal (pin 16).

2. Chrominance PAL :

The FMPV signal is passed via pin 38 to the signal electronic IC, from which the subsequent low pass filter filters the 627 kHz signal. The ACC amplifier amplifies and controls the chrominance amplitude. In the main converter the chrominance signal is mixed with 5.06 MHz back to the original 4.43 MHz. The 5.06 MHz are generated during playback from the free-running oscillator and the $(40+1/8) f_H = 627\text{ kHz}$ frequency derived from the $321f_H - VCO$. After the main converter the chrominance signal is largely cleaned from the neighbouring track crosstalk by the 2H comb filter (CCD-IC 7060). The chrominance signal is then filtered by the band pass filter, checked by the colour killer looped through by pins 28 and 29 and is finally added to the Y signal.

3. Chrominance SECAM B/G :

The signal path is nearly identical to PAL.
The differences are:

- ♦ The 321 fH VCO is synchronised by the sync
- ♦ No phase rotation
- ♦ The comb filter is off
- ♦ The internal bandpass filters have a wider bandwidth
- ♦ No colour killer function, colour is always on

4. Chrominance SECAM L

The chrominance signal is fed in at pin 29, for further circuit description see OIO.

5. NTSC

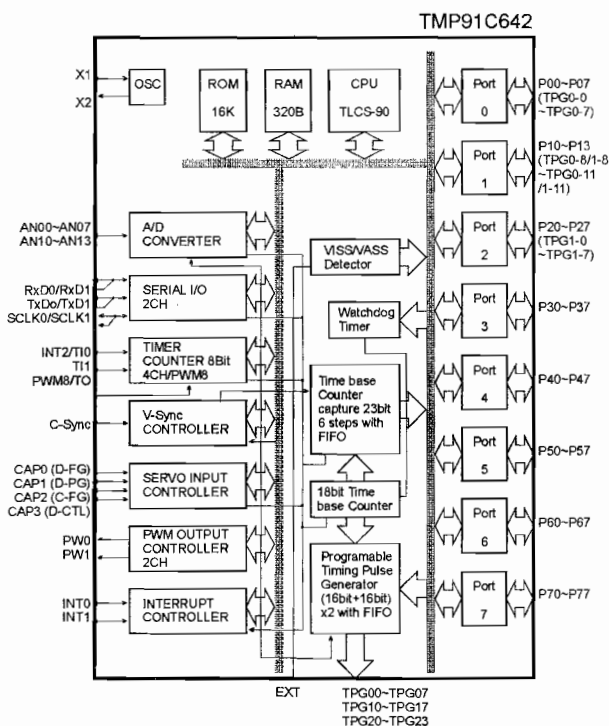
During playback of NTSC signals the original NTSC chrominance is converted to a PAL chrominance signal (control signal see above). This requires an internal IC switching in the chrominance part as well as a switching in CCD-IC 7060 onto a 1H comb filter for cross-talk attenuation. Line and image frequency, however, remain unchanged as NTSC standard.

Deck electronics - DE

1. General :

The TVC (Toshiba Video Controller) is a one chip microcontroller with the following functions.

- ♦ 12k byte ROM
- ♦ 320 byte RAM
- ♦ 8-bit A/D converter
- ♦ 2 serial bus interfaces
- ♦ 2 12-bit PWM outputs
- ♦ 1 8-bit PWM output
- ♦ Composite sync input
- ♦ Special servo inputs



The TVC contains two serial interfaces for data exchange with other μ P's. The element is supplied in QFP (64 pin) or SDIP housing (64 pin).

Four analogue outputs are available each with 8 bit resolution. The maximum processed input voltage range is 0 ... 5V (determined by the reference voltages AVSS and AVCC). Three analogue outputs are available, two with 12 bit and one with 8 bit resolution. The outputs supply a signal with a constant frequency (PWM8 approx. 20 kHz, PWM1, PWM2 approx. 39 kHz) with variable pulse/pause ratio.

2. SAA 1310 interface DM - DE :

a) CTL stage :

The IC SAA 1310 contains a write/read stage for the CTL track, with the possibility of interference-free overwriting of an existing CTL track. The playback stage contains a "digital", two-stage AGC. Using comparators, this circuit logic identifies the size of the output signal supplied by the CTL head and then selects the best amplifier gain in the playback stage. The CTL head voltage can therefore vary considerably if $V_{max} / V_{min} \gg 1$. The LP mode has the slowest tape speed. The highest speed sets in with FAST WIND or FAST SEARCH. To ensure that under the above conditions the pulse/interval ratio of the tape sync is always correctly reproduced (important for recognising VISS marks), the amplifier must not be overdriven.

The two-stage AGC cannot process the large dynamic range of the input voltage on its own. The amplifier contains therefore also an internal low pass feature ($f_g = 3$ kHz typ.) (internal). The amplification is also further reduced for all winding modes by transistor 7403.

In this case, the signal IWIND = "L" and T7403 is disabled. The transistor is deliberately polarity inverted, as the inverse operation has better attenuating qualities for this application. If T7403 is disabled, the amplification is determined mainly by the internal negative feedback resistors of the SAA 1310 and the external resistor R3454. By random short-circuiting R3454 with T7403 the amplification can be reduced in the following ratio:

$$V_{on} / V_{off} = 1 + R3454 / 100$$

Situated parallel to the CTL head is the R.C. circuit of C2411 and R3453. Together with the CTL head inductance, the capacitor causes a resonance peaking at approx. 10 kHz. The R3453 attenuates this peaking and causes an aperiodic transient response of the resonance. A steep fall of the frequency transmission characteristic occurs beyond resonance, providing an effective suppression of high-frequency stray pickup. The CTL head signal amplitude in SP is approx. 1 mVpp (typical). Therefore the gain of the playback amplifier has to be correspondingly high. To avoid offset problems, a 47 μ F electrolytic capacitor (C2410) is integrated in the negative feedback branch for DC decoupling. The polarity of the playback amplifier can be reversed with the Capstan-Reverse (CREV) voltage. This enables the TVC to always "identify" the correct sync edge as falling edge independent of the tape feed direction. The W/R (Write/Read) signal changes between record and playback.

W = high and R = low.

b) POR (Power On Reset) generator :

The POR generator contained in the SAA 1310 requires only one external capacitor C2414 defining the length of the POR pulse. At 33 nF, t_{por} is approx. 30 ms. The response threshold is at approx. 4.5 and 4.8 V. Supply voltage interruptions shorter than $t_{por}/100$ and not falling below a 3.5 V level do not trigger a POR.

c) The sensor interface :

The four comparators in the SAA 1310 are used to convert sensor signals to logic levels. Two of these comparators have open collector outputs (pins 11 and 13), which can source a current of 100 mA. The outputs are overload protected by a current limiter and thermal shutdown. Only the non-inverting input of each comparator is accessible from the outside. The other inputs are connected to the internal reference voltage of 2,5 V nom. The fixed hysteresis of the comparators of approx. 10 mV is also internal.

The following sensors are evaluated:

Comparator 1: In = FTA, pin 5; Out = FTAD, pin 15 :

FTA = threading tachometer. This signal is provided by a forked light barrier in the deck. An infra-red light beam is interrupted by a four-blade impeller (butterfly). The output amplitude of the light sensor has to have a minimum variation of between 2V and 3V to ensure correct evaluation. Using R3449, an additional hysteresis is obtained.

Comparator 2: In = WTR, pin 6; out = WTRD, pin 14:

WTR = Winding tachometer right, stems from a reflected light beam. The same minimum output requirement as for the FTA applies.

Comparator 3: In = WTL, pin 7; out = WTL D, pin 13:

WTL = Winding tachometer left, see above (not for ECO).

Comparator 4: In = FG, pin 8; Out = FGD, pin 11:

FG = Capstan tachometer. This signal stems from the sensor print from a tachometer HALL sensor amplifier in the motor unit. The output impedance is approx. 10 kOhm. The amplitude of the near sine-shaped signal is typically 1 Vpp. The minimum acceptable level is 300mVpp. The signal is AC-coupled via C2415. To enable a bias current the input at pin 8 is connected to the reference voltage at pin 3 via resistor 3452. The capacitor C2413 parallel to 3452 serves to remove high-frequency noise.

3. Interface to the headwheel motor driver :

The connection to the HMO driver TDA 5140 on OHA print is via connector 1915.

REEL is the speed/phase regulating signal.
The resolution is 14 bit.

PG/FG is the combined POS/tachometer signal of TDA5140.

The current drawn under ambient temperature from the +14M1 is typically 70mA. During the start-up period of the motor approx. 0.5 A flow for a short time.

4. Interface to the Capstan motor :

a) Motor driver interface :

The Capstan motor turbo drive IC is driven via connector 1913. CAP is the Capstan speed signal, which can vary without load between 0 and 5 V.

By means of CREV (Capstan reverse) the direction of the motor rotation is changed. The signal is fed via a diode to the motor driver, thus effectively preventing a latch-up (otherwise the current limiter fails). The motor current - especially for a loaded motor - causes a considerable voltage drop on the ground supply lines (print traces, cables, connectors). This increases the ground potential (GNDM1) of the driver IC compared to the control voltages, referring to GNDD. When the ground has been increased by approx. 0.3 V in comparison to the GNDD and CREV = "L", a parasitic clamping current flows through the IC substrate diode. This causes a malfunctioning of the current limiter circuit. The diode in the CREV line prevents a current flow in the substrate diode. The maximum current consumption of the motor is limited to 1 A. Typical values in the PLAY mode are 0,2 ... 0,3 A.

b) Tachometer preamplifier :

The tachometer preamplifier is arranged inside the deck and discretely designed as a DC coupled differential amplifier. AC and DC amplification are different to avoid problems with the offset of the MRH element. Common-mode signals are suppressed by 11 dB at 1 kHz with an AC amplification of typically 26 dB at 1 kHz.

5. Threading motor driver :

The TMO driver is provided in a bridge circuit using a dual power opamp. L2722. This IC can supply an output current of +/-1A. It contains short circuit and thermal overload protection and integrated fly-back diodes at the outputs. The output voltage is limited to approx. 0.7 A (start or motor blocked) by the internal resistance of the threading motor (typically 18 Ohm).

Between the IC outputs (pin 1 and 3) a Boucherot element (1 E5, 100 nF) is arranged to suppress a 3 MHz spurious oscillation from the power amplifier. One half of the bridge is controlled via the TMO line and functions as comparator. The other half is an amplifier-integrator with a 3.9 x gain. A variation of the input voltage (THIO) between 0 and 5V causes a voltage variation at the output between 0V and near supply voltage. In case of a 50% modulation (THIO = 2,5V), pin 3 has approx. 7V. The capacitor in the Opamp negative feedback serves to filter out the PWM frequency of approx. 21,5 kHz. In the event of a Power On Reset, the TVC takes the THIO line "L", whereas TMO is "H". The above polarity must be observed to ensure that no current is applied to the motor during the POR pulse period. This prevents motor damage caused by excessive triggering and blocking. This has, however also the disadvantage that if the 5V supply fails (i.e. fuse 1400 has blown) residual voltages pass to the IC inputs via the still applied 14 V voltages. These activate the comparator and the Opamp contrary to one another leading to a coil short-circuit, in the blocked threading motor. To avoid this problem a separate reference divider (R3438, R3439) is provided for the comparator section. Both outputs of the L2722 are now in common-mode in the event of the above failure.

6. Analogue interface to the TVC :

The following analogue levels are supplied to the TVC internal A/D-converter :

- ♦ TRIV Tracking information video
- ♦ TAE/TAS Tape end/tape start detection
- ♦ I/R Combined information from INIT and record protection
- ♦ AGC Automatic gain control

7. Tape end - LED - control :

The LED current is controlled by transistor 7404. The ON time is approx. 1 ms. with an ON/OFF ratio of 0.09. C2404 slightly attenuates the slopes to avoid interference in the audio signal electronics. The LED current is typically 65 mA. To avoid carrying disturbances with the relatively large impulsed current throughout the set, the LED is supplied by the +14M1.

8. Sensing of the drive switches :

The drive contains two switches :

INIT	initialisation switch
RECP	record protection

The state of these two switches can be input with a single line (I/R) in one of the analogue inputs of the TVC (pin 57). For this all switch outputs with a level of either "H" (5V) or "L" (0 V) are coupled via a resistor-driver network (R3444, R3445). Each possible switch combination thus corresponds to a unique voltage level on the I/R line.

9. Test picture generation for non VPT/OSD sets

Using the resistor network R3422, R3424, R3425, R3426 a test picture is generated (sync, black, white) and fed into the signal electronic IC 7051.

10. Version definition :

Only one ROM mask is used. All appropriate settings are stored in the EEPROM as 5 option bytes.

11. EEPROM :

An EEPROM is an electrical erasable and writable non-volatile ROM (information remains if operating voltage fails). The R/W cycle takes place via the serial IIC-Bus SDA, SCL. It is possible to save set or deck-specific parameters, for example, X-distance, gap position, tuning limits (for "Amtsblattfestigkeit" and possibly also differences between TAE and TAS; left and right tolerance of the tape end light barrier (previously coupled photo transistors were used). Consequently the preset potentiometer for the gap position is no longer necessary. The adjustment occurs automatically when using a test cassette and by pressing certain keys. The preset channels and some options are also saved in the EEPROM.

12. CMT detection :

These were extended due to problems with VST sets. The CSYNC wire is connected with two TVC pins. As before, the 50 Hz can be detected on one pin (pin 12, port 33) and additionally the 15,625 kHz can be filtered from another pin (pin 8, port 47), i.e. a safeguard was installed so that only real video signals are stored.

IN/OUT - IO - I/O part

1 Scart version with TDA5950:

This IC contains an internal switch for video and audio.

Video:

The video signal is switched via the IS1 line (deck μ P 7410) between the input sources VIN1 and the front end video (inside IC TDA5950) and passed to the signal electronic VS via the VBS line.

Audio:

The IS1 line (deck μ P 7410) chooses between AIN1 and the front end audio (inside IC TDA5950) and passes one of the two signals to the linear audio / AL AOTDA or AMLR.

General: The IPBV line mutes the input selection during playback, i.e. no signal is passed to the signal electronic VS.

2 Scart version for PAL/SECAM models:

Video:

The following DC free signals are applied to the STV6400 [7552] inputs: VFV, VIN1, VIN2, VSB. In the STV6400 the input for the signal electronic signal VSB (2 Vpp) is provided with a divider (1/2). Outputs pin 15 (VOUT2) and pin 16 (VOUT1) contain a 6dB amplifier. Only OUT1 pin 2 has no amplifier. This output passes to the signal electronic VS VBS. Via the IIC-BUS various input signals are switched by the controller to the various outputs (see list in IO circuit). To Scart 1 VOUT1 and to Scart 2 VOUT2. Downstream of the signal electronic is a modulator (VSB).

Audio:

There are two HEF4053 ICs selecting from the four audio sources (E1, E2, FV, linear audio) and passing them on to the three audio outputs (E1, E2, linear audio).

a) Decoder switch 1/3 HEF4053 [7550]

The front end (AFV) audio is applied to pin 12 of 7550 and the added signal (L+R, AIN1) of Scart 1 is applied to pin 13. The changeover line DEC pin 11 [7550] is provided by the STV6400 [7552] via pin 5.

The logic is transferred to the STV6400 [7552] by the control μ P via the IIC-Bus. The output of this switch AOUT2 pin 14 [7550] moves to Scart 2 (decoder socket E2). A downstream emitter follower decouples at low-resistance (interference).

b) Monitor switch 1/3 HEF4053 [7550]

The audio signal of the linear audio part (AML) is applied to pin 5 of [7550], at pin 3 the added signal (L+R, AIN1) of Scart 2 is applied. The changeover line MON pin 9 [7550] is provided by the STV6400 [7552] via pin 13.

The logic is transferred to the STV6400 [7552] by the control μ P via the IIC-Bus. The output of this switch AOUT1 pin 4 [7550] moves to Scart 1 (monitor socket E1). A downstream emitter follower decouples at low-resistance (interference).

c) Linear audio input switch

The audio signal of Scart 1 (AIN1) is applied to pin 2 of [7550], at pin 1 the added signal (AIN2) of Scart 2 is applied. The changeover line IS2 pin 10 [7550] is controlled by a control μ P via the IIC-bus to the ST6400 [7552] which provides this line via pin 7. The output of this switch pin 15 [7550] passes to a further 1/3 HEF4053 [7551] pin 3 and the audio front end signal (AFV) at pin 5. The switching line IS1 pin 9 [7550] is controlled by deck μ P pin 38 [7410] which provides this line via pin 9 [7551]. The output of this switch AMLR pin 4 [7551] passes to the linear audio.

VPS :

The VPS IC SDA5642 [7540] reads the data supplied by the transmitter from line 16 and passes the data required for the timer start to the control μ P. Also data like station names are passed to the μ P.

PDC/VPS : (for PAL-I sets with auto install only)

The PDC IC SDA5649 [7540] reads out the data supplied by the station in the vertical blanking gap. This data is separated into two formats:

PDC format 2 - this contains relevant programming help data, and PDC format 1 - this contains the station names.

This IC can also evaluate the VPS data.

IN/OUT - OIO - VS part

Secam L

Recording:

The FBAS signal (VBS) passes from the I/O part via the soldered connection [1952] (pin 5) and the emitter follower [7101] to the bell filter (cloche) reversing the station Rf-pre-emphasis. In the Secam L IC pin 29 [7151] the signal passes through a 15 dB amplifier and limiter with downstream frequency divider via pins 24 and 25.

This frequency divider generates through frequency division (1:4) of the chrominance signal the 1.1 MHz signal required for recording which is applied to pin 21 with the downstream band pass filter. The band pass filter attenuates the harmonics created by the frequency division. Simultaneously the chrominance signal is read out at this stage during the line synchronous pulse. It then passes through a 10 dB amplifier and is applied to pin 15 to an anti-cloche filter. The filter in turn generates the FM-pre-emphasis which is standard specification for a Secam chrominance signal. This is then passed as a CSR signal to the signal electronic part, where it is added to the Y signal.

Control of record/playback

The switch between record and playback is effected by the 5VPB voltage. In case this voltage is missing, the CB diode of transistor 7105 (collector 0V) becomes conductive, moving the voltage of pin 23 to 1.3 V, so that the IC switches from playback to record.

Playback:

During playback the FM signal (FMPV) is passed to pin 23, amplified by 6dB, passed via the same band pass filter as during recording and is once again amplified by 10dB. Downstream of pin 15 the RF-pre-emphasis of the recording is reversed, the anti-cloche circuit operating in this case as cloche circuit, as the filter is in the feedback branch of a further amplifier in IC [7151]. In the subsequent stages the signal is controlled (AGC) and its frequency is doubled (rectifier). The band pass filter on pin 10 cleans the signal of interfering harmonics before it is once more doubled in frequency. For the signal to become a standard Secam chrominance signal it is reequipped with a RF-pre-emphasis (anti-cloche). The chrominance signal finally passes through a colour killer stage, a band pass filter and an emitter follower, before being applied as a CSP signal to pin 28 of the signal electronic IC [7051].

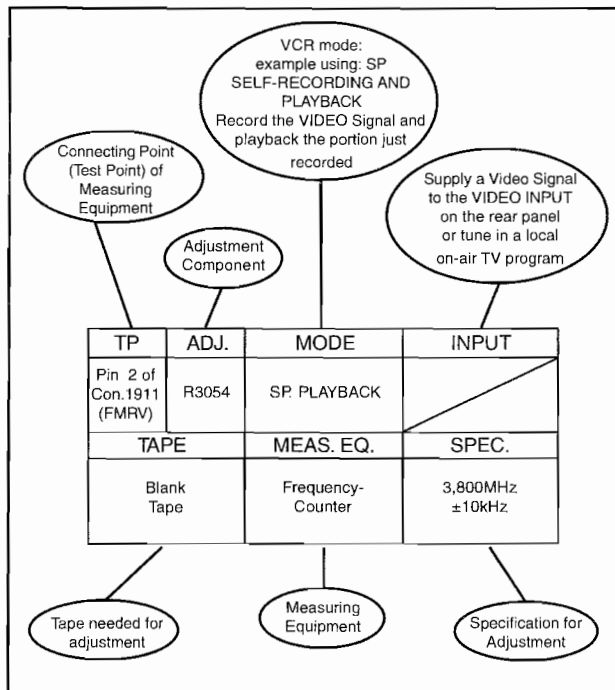
Remarks:

Electrical Adjustment Instructions

Test equipment:

1. Dual-trace oscilloscope
Voltage range : 0.001 ~ 50 V/div
Frequency : DC ~ 50 MHz
Probe : 10:1, 1:1
2. DVM (Digital Voltmeter)
3. Frequency counter
4. Sinus generator
Sinus : 0 ~ 50 MHz
5. Test pattern generator
6. VHS Alignment Tape 4822 397 30103

How to read the adjustment procedures:



Video signal processing - OFB

1. Sync level frequency (3054) :

Purpose: To maintain the recording interchangeability by adjusting the sync frequency and deviation.

Symptom, if incorrectly set:
Record interchangeability is inadequate.

TP	ADJ.	MODE	INPUT
Pin 2 of Con.1911 (FMRV)	R3054	Record Preset E1	No input signal
TAPE		MEAS. EQ.	SPEC.
Blank Tape		Frequency-Counter	3,800MHz ±10kHz

2. Chrominance record current adjustment :

Purpose: To set the optimum record chrominance level.

Symptom, if incorrectly set:
If the record level is too high, beats may be seen in the picture.
If the level is too low, the colour may be degraded.

2.1 PAL Chrominance record current adjustment (3038)

Before commencing adjustment, connect Pin 2 of IC7051 to Pin 13 (+5V).

TP	ADJ.	MODE	INPUT
Pin 2 of Con.1911 (FMRV)	R3038	Record of Preset E1	(VIDEO IN E1) Red Picture 75% Saturation
TAPE		MEAS. EQ.	SPEC.
Blank Tape		Oscilloscope Video Pattern Generator	X=71mV _{pp} (-12,5dB relative to the luminance signal) see Fig.1

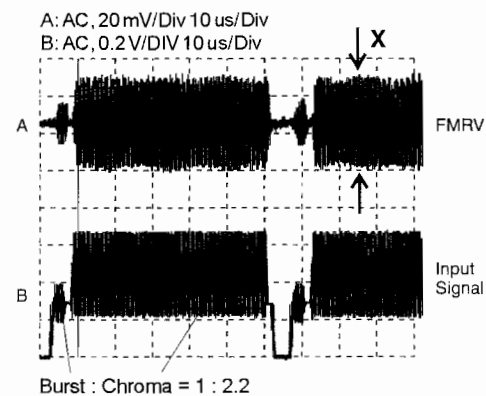


Fig. 1

2.2 SECAM Chrominance record current adjustment (3042)

Before commencing adjustment, connect Pin 2 of IC7051 to Pin 13 (+5V).

TP	ADJ.	MODE	INPUT
Pin 2 of Con.1911 (FMRV)	R3042	Record of Preset E1	(VIDEO IN E1) Red Picture SECAM 75% Saturation
TAPE		MEAS. EQ.	SPEC.
Blank Tape		Oscilloscope Video Pattern Generator	X=42mV _{pp} (-17dB relative to the luminance signal) see Fig. 1

Front End - OFB

1. AFC - Adjustment :

Purpose: Correct adjustment of demodulator AFC - circuit.

Symptom, if incorrectly set:
Bad or disturbed TV channel reception.

1.1 PAL - AFC - Tuning (5770) :

TP	ADJ.	MODE	INPUT
IC 7772 Pin 10	L5770	E to E	38,9MHz 100mV _{pp} at Tuner 1701 Pin 17
TAPE		MEAS. EQ.	SPEC.
		DC Voltmeter Frequ. Generator	2,5V ±0,2V

1.2 PAL/SECAM - AFC - Tuning (5725) :

TP	ADJ.	MODE	INPUT
IC 7701 Pin 20	L5725	E to E	38,9MHz 100mV _{pp} at Tuner 1701 Pin 17
TAPE		MEAS. EQ.	SPEC.
		DC Voltmeter Frequ. Generator	2,5V ±0,2V

1.3 SECAM Bd.1 - AFC - Tuning (3748) :

Before commencing adjustment:

- Connect pin 1 of connector 1912 (PSS) to ground (SECAM active)
- Connect collector of 7723 to ground (Band 1 active) .

TP	ADJ.	MODE	INPUT
IC 7701 Pin 20	R3748	E to E	33,9MHz 100mV _{pp} at Tuner 1701 Pin 17
TAPE		MEAS. EQ.	SPEC.
		DC Voltmeter Freq. Generator	2,5V ±0,2V

2. HF - AGC Adjustment :

Purpose: Set amplifier control.

Symptom, if incorrectly set:

AGC synchronises incorrectly if input level is too low and causes picture distortion if input level is too high.

2.1 HF - AGC Adjustment PAL (3770) :

TP	ADJ.	MODE	INPUT
Tuner 1701 Pin 17	R3770	Set tuned to channel 24	2,2mV(67dB _μ V) on aerial input PAL white picture, audio IF on, no modulation
TAPE		MEAS. EQ.	SPEC.
		Oscilloscope Video Pattern Generator	550mV _{pp} +0/-50mV (use a 10:1 probe)

2.2 HF - AGC Adjustment PAL/SECAM (3742) :

TP	ADJ.	MODE	INPUT
Tuner 1701 Pin 17	R3742	Set tuned to channel 24	2,2mV(67dB _μ V) on aerial input PAL white picture, audio IF on, no modulation
TAPE		MEAS. EQ.	SPEC.
		Oscilloscope Video Pattern Generator	550mV _{pp} +0/-50mV (use a 10:1 probe)

Audio linear - OFB

1. Adjustment of erasing frequency (5603) :

Purpose: To set the correct recording erasing frequency.

Symptom, if incorrectly set:

Erasing frequency or its harmonics cause audio faults.

TP	ADJ.	MODE	INPUT
Pin 7 of Con. 1918 (ARH)	L5603	Record	
TAPE		MEAS. EQ.	SPEC.
Blank Tape		Frequency Counter	70kHz ±10kHz

2. Adjustment of bias current (3618) :

Purpose: Set optimum record bias current.

Symptom, if incorrectly set:

If audio bias level is too high, the frequency response deteriorates.

If the level is too low, sound distortion may occur.

TP	ADJ.	MODE	INPUT
R3600 (difference measurement)	R3618	Record	
TAPE		MEAS. EQ.	SPEC.
Blank Tape		AC Millivoltmeter	15mV _{RMS} (70kHz)

Control of 'bias' adjustment :

After the bias has been adjusted to the indicated level, make a music recording and then play this recording back. Check if sufficient treble is reproduced or if any audio distortion is present. In case of insufficient treble, reduce 'bias' current a little. In case of excessive distortion, increase 'bias' current a little. Use brand name cassettes but no chrome dioxide tapes.

3. Adjustment of playback amplitude (3606) :

Purpose: Set audio part amplification.

Symptom, if incorrectly set:

Playback sounds too faint or too loud.

TP	ADJ.	MODE	INPUT
Pin 1 of Scart 1 (Audout)	R3606	SP Self-recording and Playback	(AUDIO IN E1) 700mV _{RMS} 1kHz
TAPE		MEAS. EQ.	SPEC.
Blank Tape		AC Millivoltmeter	500mV _{RMS} ±50mV

Deck electronics - OFB

1. Software adjustment of gap positions:

Purpose: Determination of head switching pulse during playback.

Symptom, if incorrectly set:

Head switching faults and/or vertical image flickering.

TP	ADJ.	MODE	INPUT
		SP Playback	
TAPE		MEAS. EQ.	SPEC.
VHS Alignment Tape 4822 397 30103			refer to description below

- Insert test cassette with standard video signal (eg.: 4822 397 30103).
- Call up service mode (press STOP on remote control and PLAY on the set simultaneously for approx. 5 sec.).
- Simultaneously press PLAY on remote control and EJECT on the set.

This triggers the automatic adjustment and the set values are stored in the EEPROM.

After successful tuning the VCR switches to STAND BY.

In case of unsuccessful tuning the VCR ejects the cassette.

Causes :

- Standard video signal incorrect.
- Scanner faulty.
- Microprocessor faulty.

Power supply- NSM

Adjustment of output voltage +5V :

Purpose: To obtain correct operation.

Symptom, if incorrectly set:

Incorrect VCR functioning.

TP	ADJ.	MODE	INPUT
Pin 9 of Con. 1509 (+5A)	R3204	Playback	
TAPE		MEAS. EQ.	SPEC.
Any tape		DC Voltmeter	5,4V ±0,03V

Operating panel - ODC

1. Timer frequency adjustment (2005) :

Purpose: Adjustment for the exact clock running.

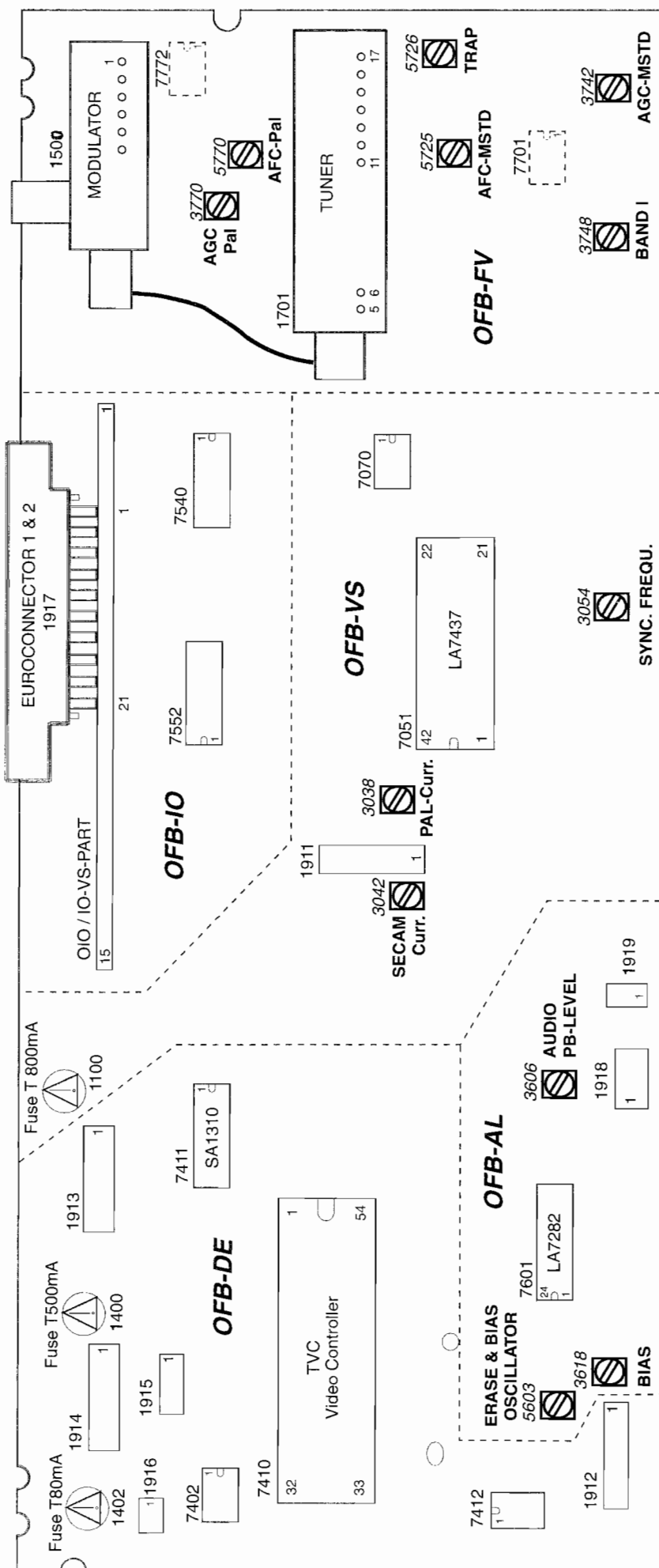
Symptom, if incorrectly set:

The clock runs too fast or too slow.

Before adjustment:

- Disconnect the set from the mains.
- Connect pin 67 and 68 of IC7101 to pin 33 (+5V).
- Reconnect the set to the mains.

TP	ADJ.	MODE	INPUT
Pin 1 of Con. 1101 (PWM)	C2005	E to E	
TAPE		MEAS. EQ.	SPEC.
		Frequency Counter	488,28125µsec ±0,715nsec



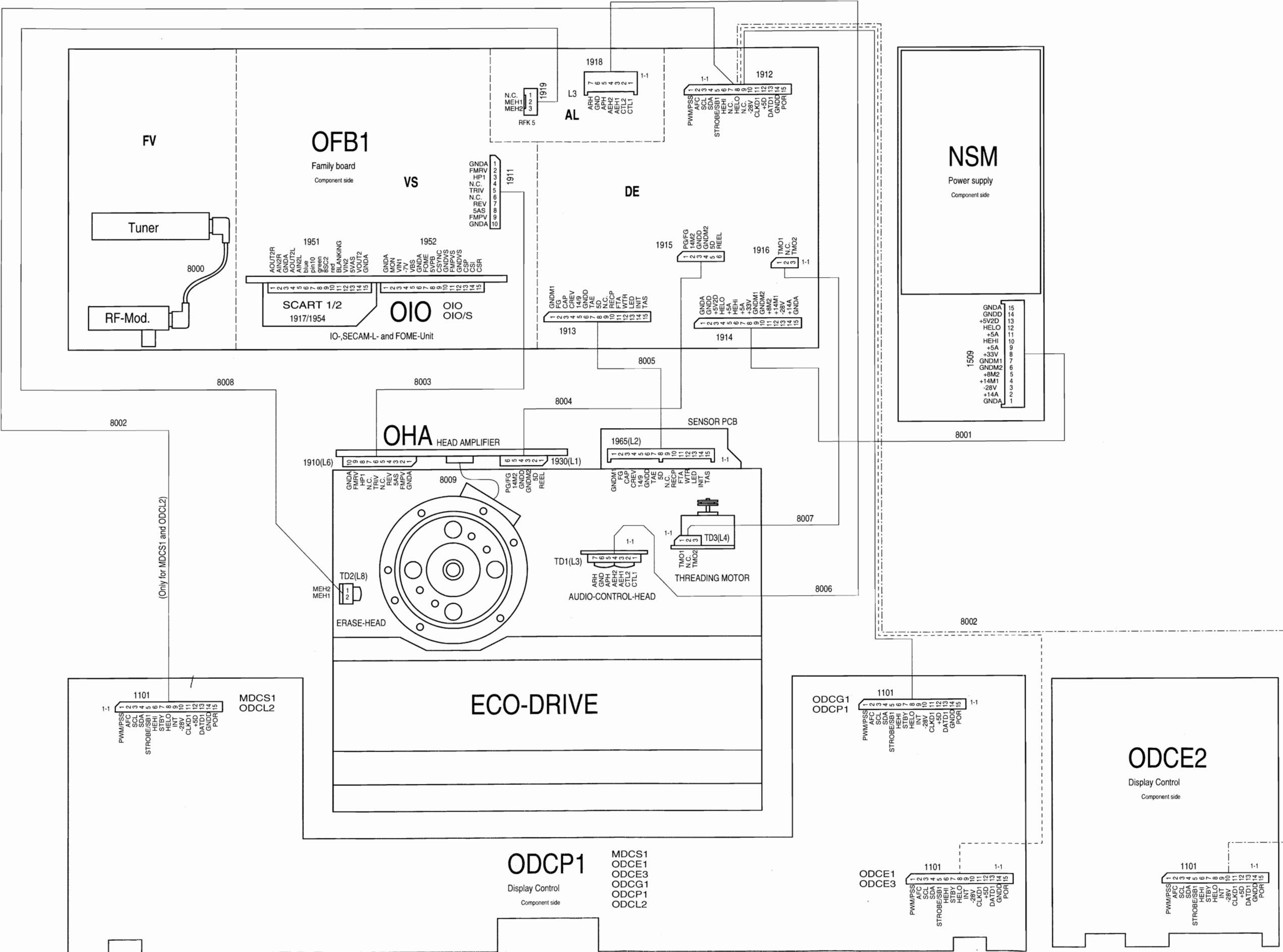
List of abbreviations

Signal	Description	Application									
+12A	+12V analog	DE	IO		AL	FV					
+14A	+14V analog	DE					PS				
+14M1	+14V for capstan-, threading- and headmotor	DE					PS		HV		
+33V	+33V for tuner tuning voltage	DE				FV	PS				
+5A	+5V analog from power supply	DE					PS				
+5D	+5V digital after fuse 1400	DE						DC	HV		
+5V2D	+5V digital from power supply	DE					PS				
+8M2	+8,2V motor supply (not used)	DE					PS				
-28V	-28V display supply	DE	IO								
-7V	-7V I/O-switches supply		IO					DC			
10SC	Pin 10 scart 1 (not used)	DE								OIO	
5VA	+5V analog	DE		VS		FV					
5VAS	+5V analog, after fuse 1100		IO	VS		FV			HV	OIO	
5VPB	+5V playback		IO	VS						OIO	
5VSE	+5V analog, after fuse and coil			VS							
8SC1	Scart 1 pin 8	DE	IO								
8SC2	Scart 2 pin 8	DE	IO							OIO	
AEH1/2	Audio erase head				AL						
AFC	Automatic frequency control	DE				FV		DC			
AFV	Audio from frontend		IO			FV					
AGC	Automatic gain control	DE				FV					
AIN1	Audio input scart 1		IO			FV					
AIN2	Audio input scart 2		IO								
AIN2L	Audio input from scart 2		IO							OIO	
AML P	Audio mono playback		IO		AL						
AML R	Audio mono record		IO		AL						
AOTDA	Audio output TDA 5950		IO			FV					
AOUT1	Audio output from scart 1		IO								
AOUT2	Audio output from scart 2		IO								
AOUT2L	Audio output from scart 2		IO							OIO	
APH	Audio playback head				AL						
ARH	Audio record head				AL						
BLANKING	Blanking pulse RGB loophthrough		IO							OIO	
BLUE	Blue signal between scart 1/2		IO							OIO	
CAP	Capstan control voltage	DE									
CKPAL	Colour killer PAL	DE		VS							
CLKD1	Serial bus clock	DE						DC			
CREV	Capstan reverse	DE									
CROT	Colour rotation on/off	DE		VS							
CSI	Colour system information	DE	IO							OIO	
CSP	Chrominance secam playback		IO	VS						OIO	
CSR	Chrominance secam record		IO	VS						OIO	
CSYNC/1	Composite sync pulse	DE	IO	VS					HV	OIO	
CTL1/2	Control track signal	DE			AL						
DATD1	Serial bus data	DE						DC			

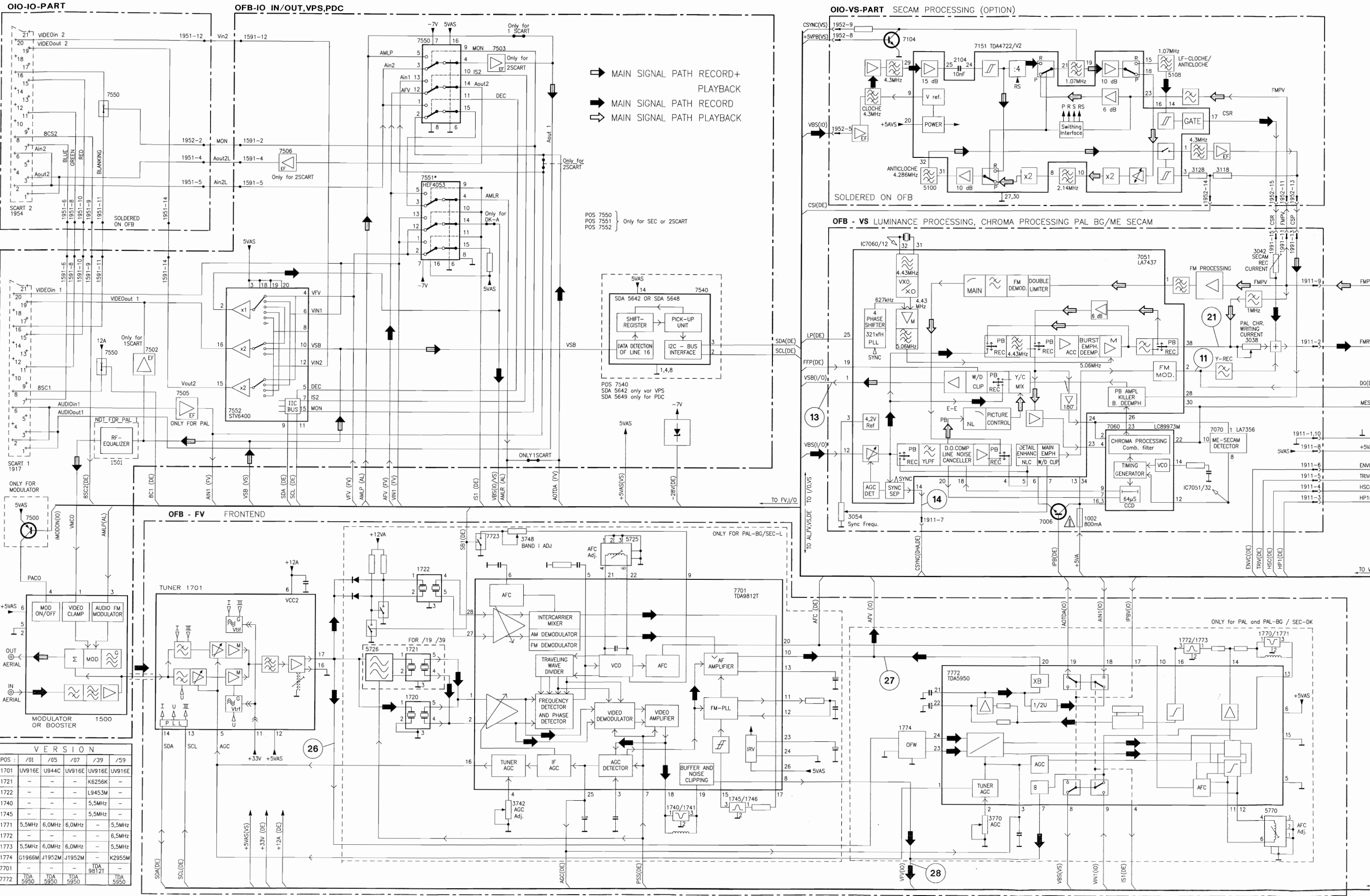
DEC	Audio switching voltage		IO							
DO	Drop-out compensation on/off	DE		VS						
ENVC	Envelope comparator signal	DE		VS					HV	
FFP	Feature frame pulse	DE		VS						
FG	Capstan tacho pulse	DE								
FGD	Capstan tacho pulse digital	DE								
FMPV	FM video playback secam			VS					HV	
FMPVS	FM video playback		IO	VS						OIO
FMRV	FM video record			VS					HV	
FMSW	FM band-pass filter switching	DE		VS						
FTA	Threading tacho	DE								
FTAD	Threading tacho digital	DE								
GND A	Ground analog	DE	IO	VS			PS		HV	OIO
GND D	Ground digital	DE					PS	DC	HV	
GND M1	Ground threading- and headmotor	DE					PS		HV	
GND M2	Ground capstan motor	DE					PS			
GND VS	Ground signal electronics		IO							
GREEN	Green signal between scart1/2		IO							OIO
HEHI	Heater for displaytube low	DE					PS	DC		
HELO	Heater for displaytube high	DE					PS	DC		
HMO	Head drum motor								HV	
HP1	Head switching pulse	DE		VS					HV	
HSC	Head select control	DE		VS					HV	
HSC2	Colour phase switching for LP feature mode	DE		VS						
I/R	Init- and recordswitch	DE								
IMODON	Inverse modulator on/off	DE	IO							
INIT	Deck switch	DE								
INTSC	Inverse NTSC-playback	DE		VS						
IPAL	Inverse playback audio linear	DE			AL					
IPB	Inverse playback	DE								
IPBV	Inverse playback video	DE	IO			FV				
IPOR	Inverse power on reset	DE								
IRAL	Inverse record audio linear	DE			AL					
IREV	Inverse record video	DE		VS						
IS1	Input select 1	DE	IO			FV				
IS2	Input select 2		IO							
ITRICK	Comb filter by-pass during feature mode	DE		VS						
IWIND	8V/14V switching for capstan motor	DE								
LED	LED-tower supply	DE								
LP	Longplay on/off	DE		VS						
LPA	Longplay audio	DE			AL					
MEH1/2	Main erase head				AL					
MES	Middle East secam	DE		VS						
MON	Monitor loop through scart 1/2		IO							OIO
MTA	Audio mute	DE			AL					
NC	Not connected	DE								
PG/FG	Head wheel position/-speed	DE							HV	
POR	Power on reset	DE						DC		

POS	Position pulse headwheel									HV	
PSS	PAL or secam-L	DE				FV		DC			
RALM	Record audio linear + mute	DE			AL						
RECP	Record protection	DE									
RED	Red signal between scart1/2		IO								OIO
REEL	Head wheel control	DE								HV	
REV	Record video									HV	
SB1	Secam band 1	DE				FV		DC			
SCL	IIC bus clock	DE				FV		DC			
SDA	IIC bus data	DE				FV		DC			
SYNC	Control track pulse	DE									
TAE	Tape end detection	DE									
TAS	Tape start detection	DE									
THIO	Threading motor in/out	DE									
TMO	Threading motor on/off	DE									
TMO1/2	Threading motor connection	DE									
TRIV	Tracking information video	DE		VS						HV	
VBS	Video to signal electronics		IO	VS		FV					OIO
VFV	Video from frontend		IO			FV					
VH1/2	Video heads									HV	
VIN1	Video input scart 1		IO			FV					OIO
VIN2	Video input scart 2		IO								OIO
VISS	Control sync pulse inversion	DE									
VOUT1	Video output scart 1		IO								
VOUT2	Video output scart 2		IO								OIO
VSB	Video from signal electronics		IO	VS							
W/R	Control track write/read	DE									
WTL	Wind tachometer left	DE									
WTR	Wind tachometer right	DE									
WTRD	Wind tachometer right digital	DE									

Wiring Diagram

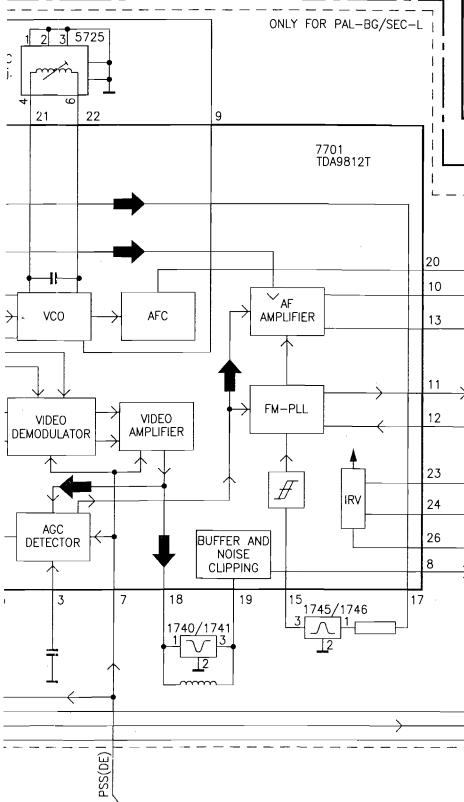
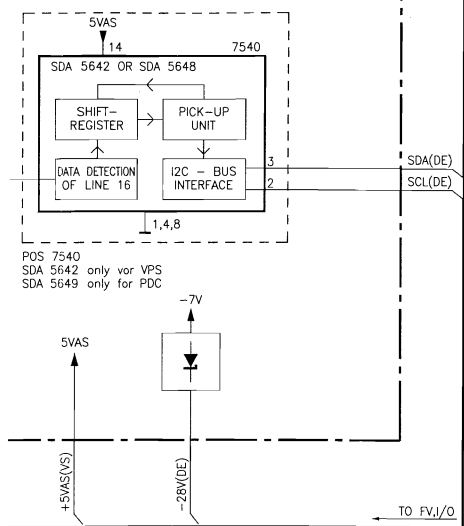


Block Diagram Analog Part Olivia Eco

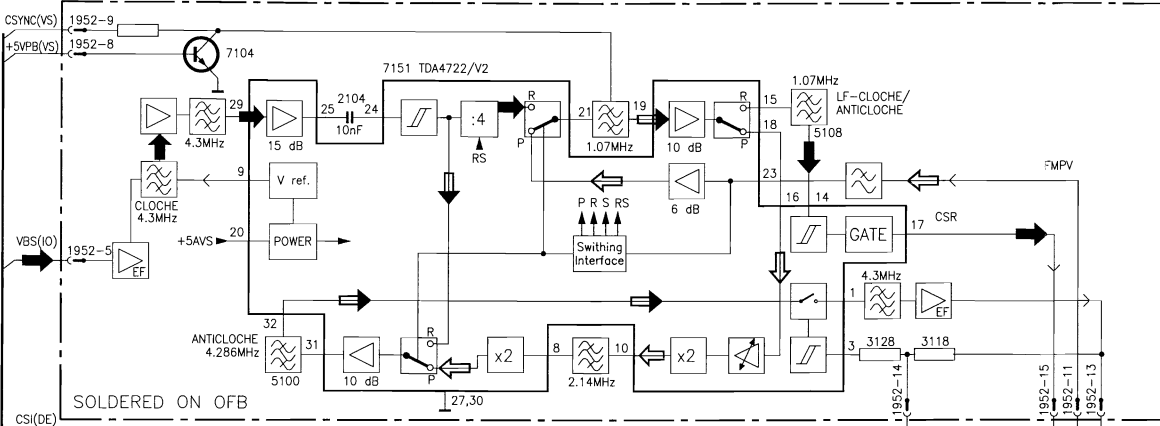


- ▶ MAIN SIGNAL PATH RECORD+
PLAYBACK
- ▶ MAIN SIGNAL PATH RECORD
- ▶ MAIN SIGNAL PATH PLAYBACK

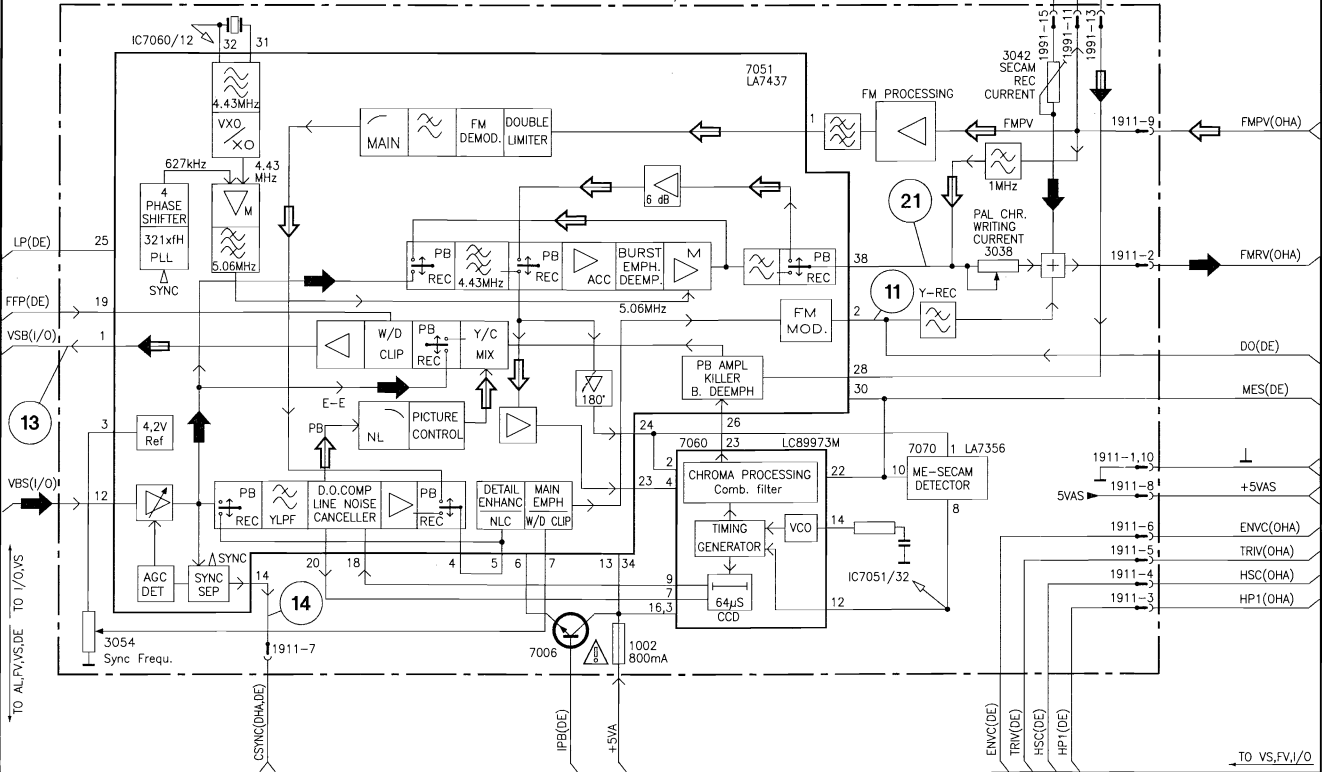
7550 } Only for SEC or 2SCART
7551 }
7552 }



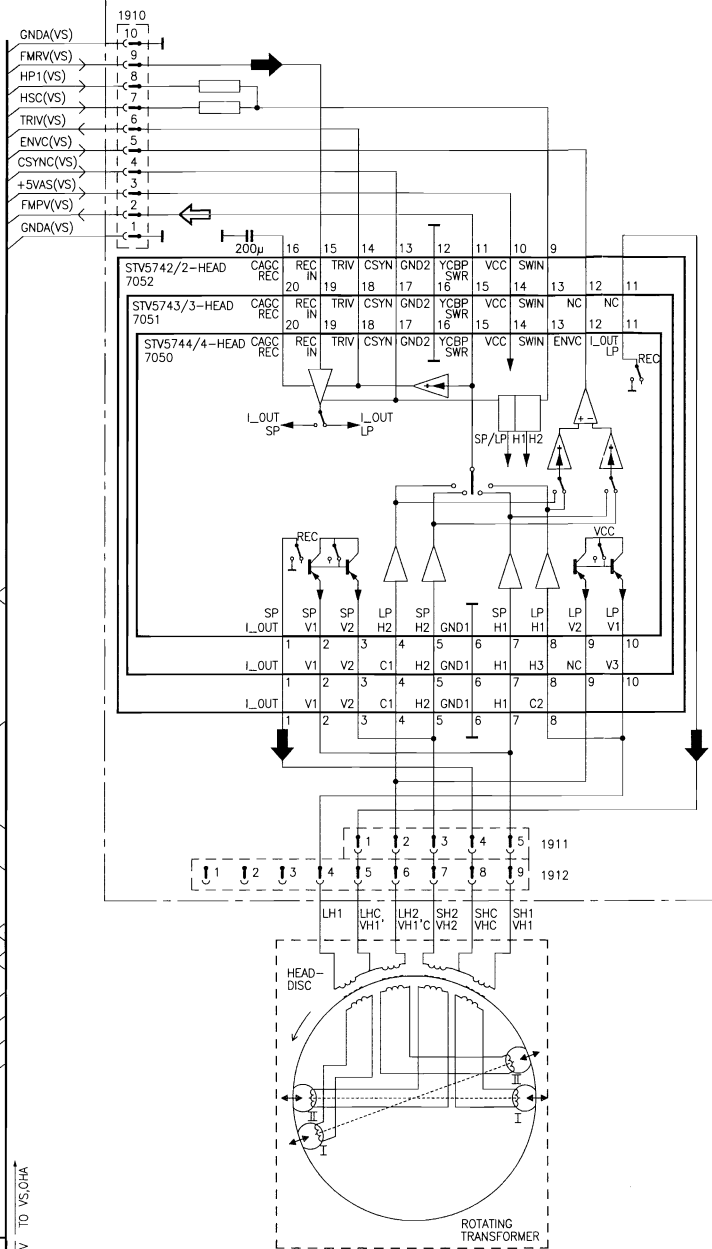
OIO-VS-PART SECAM PROCESSING (OPTION)



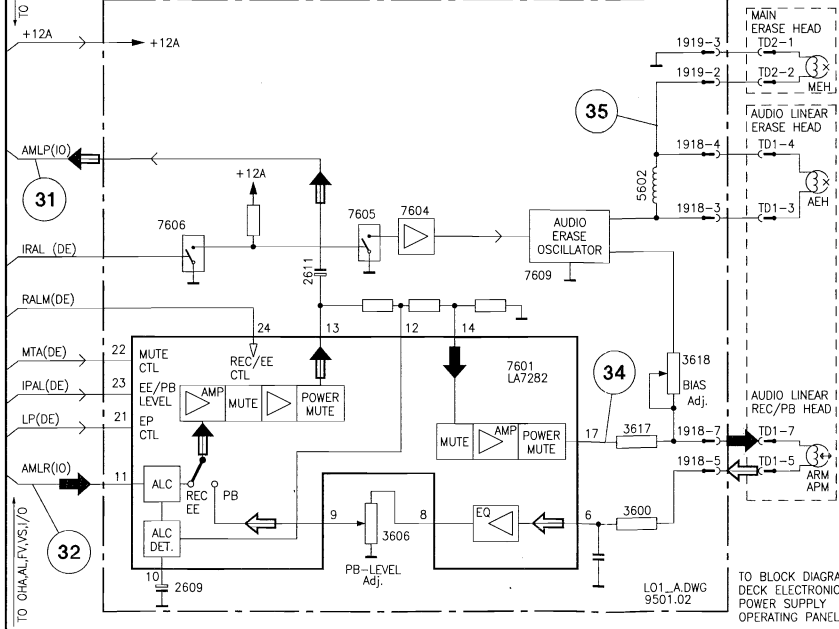
OFB - VS LUMINANCE PROCESSING, CHROMA PROCESSING PAL BG/ME SECAM



OHA HEAD AMPLIFIER

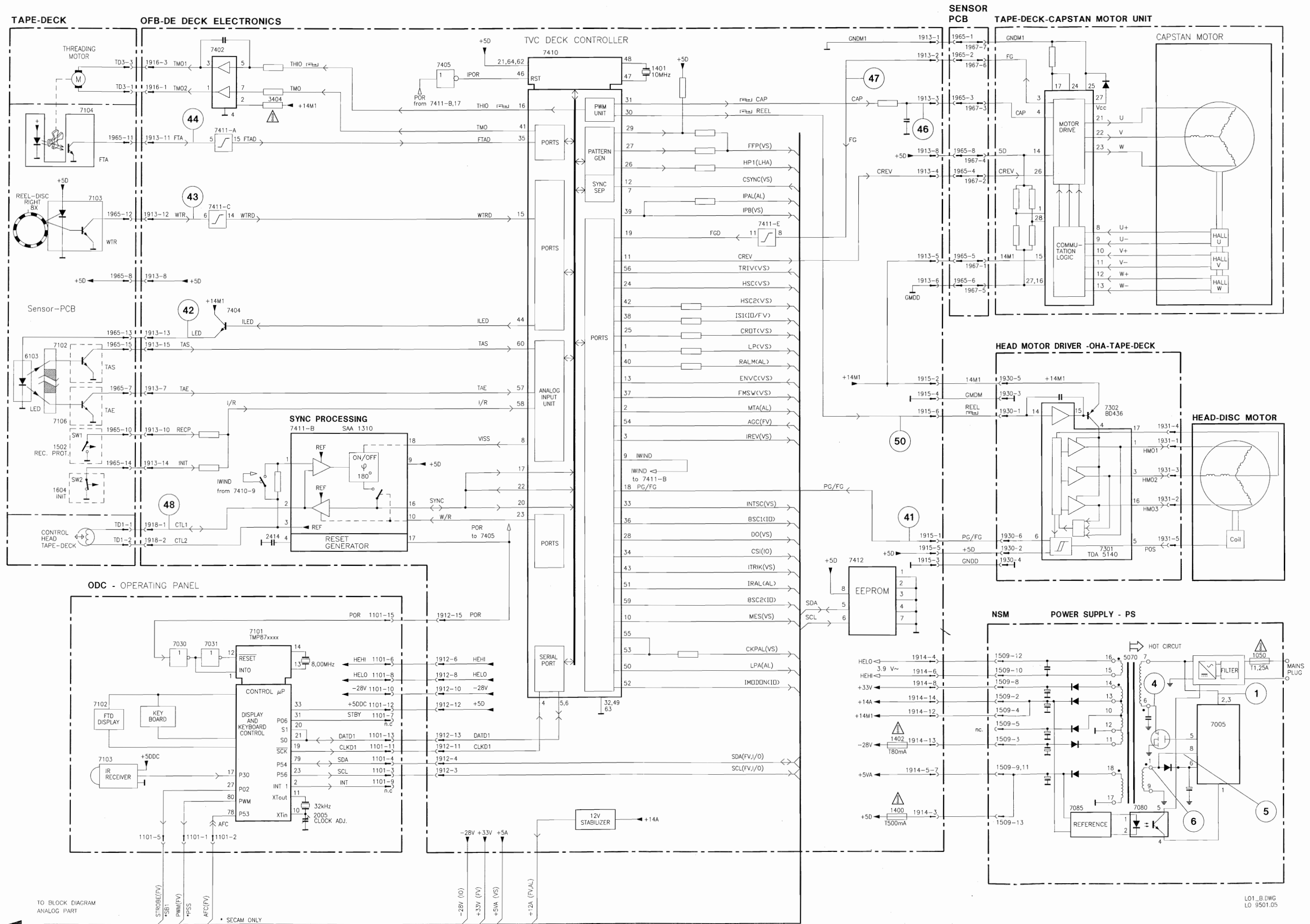


OFB - AL AUDIO LINEAR



TO BLOCK DIAGRAM
DECK ELECTRONIC
POWER SUPPLY
OPERATING PANEL

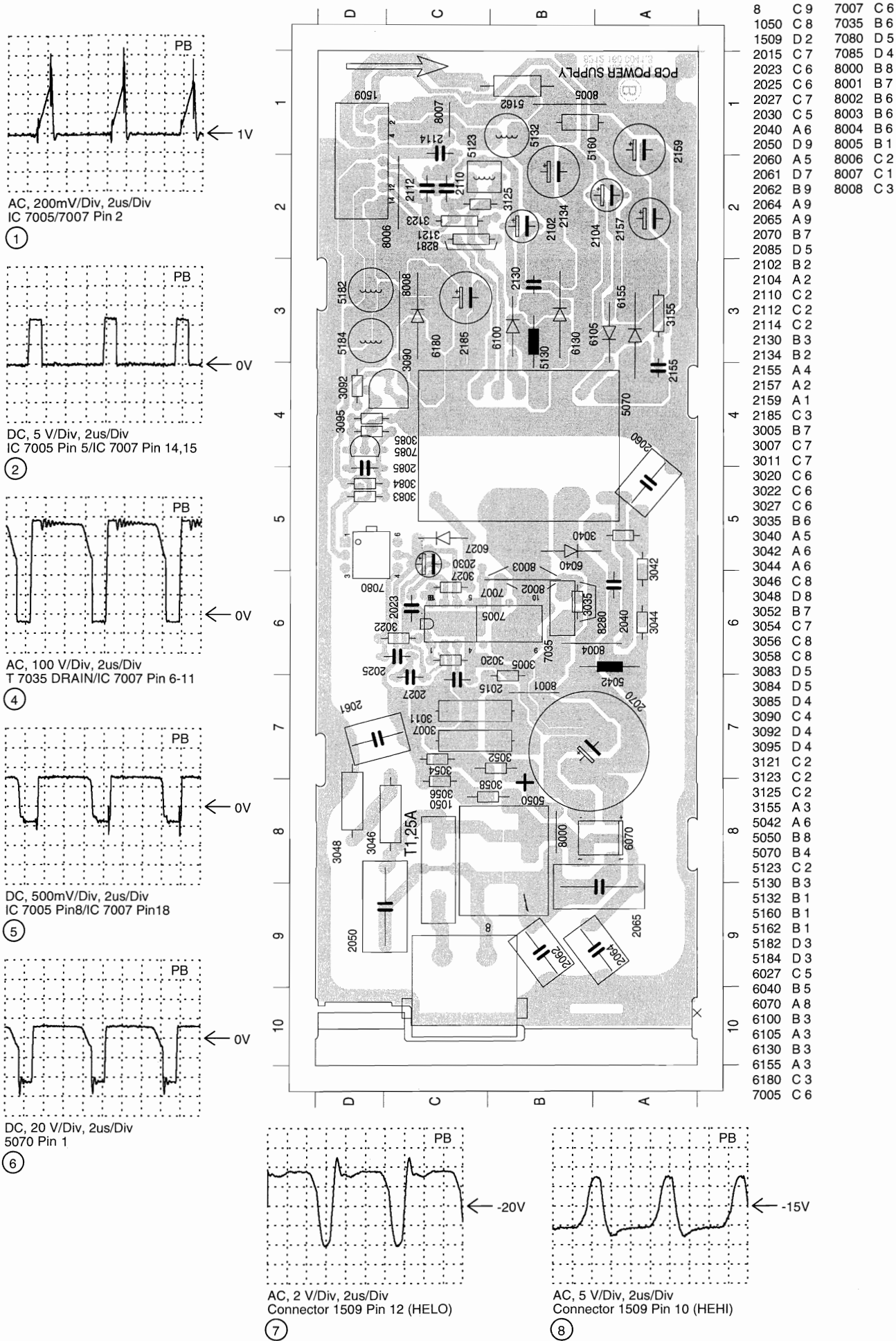
Block Diagram Digital Part Olivia Eco



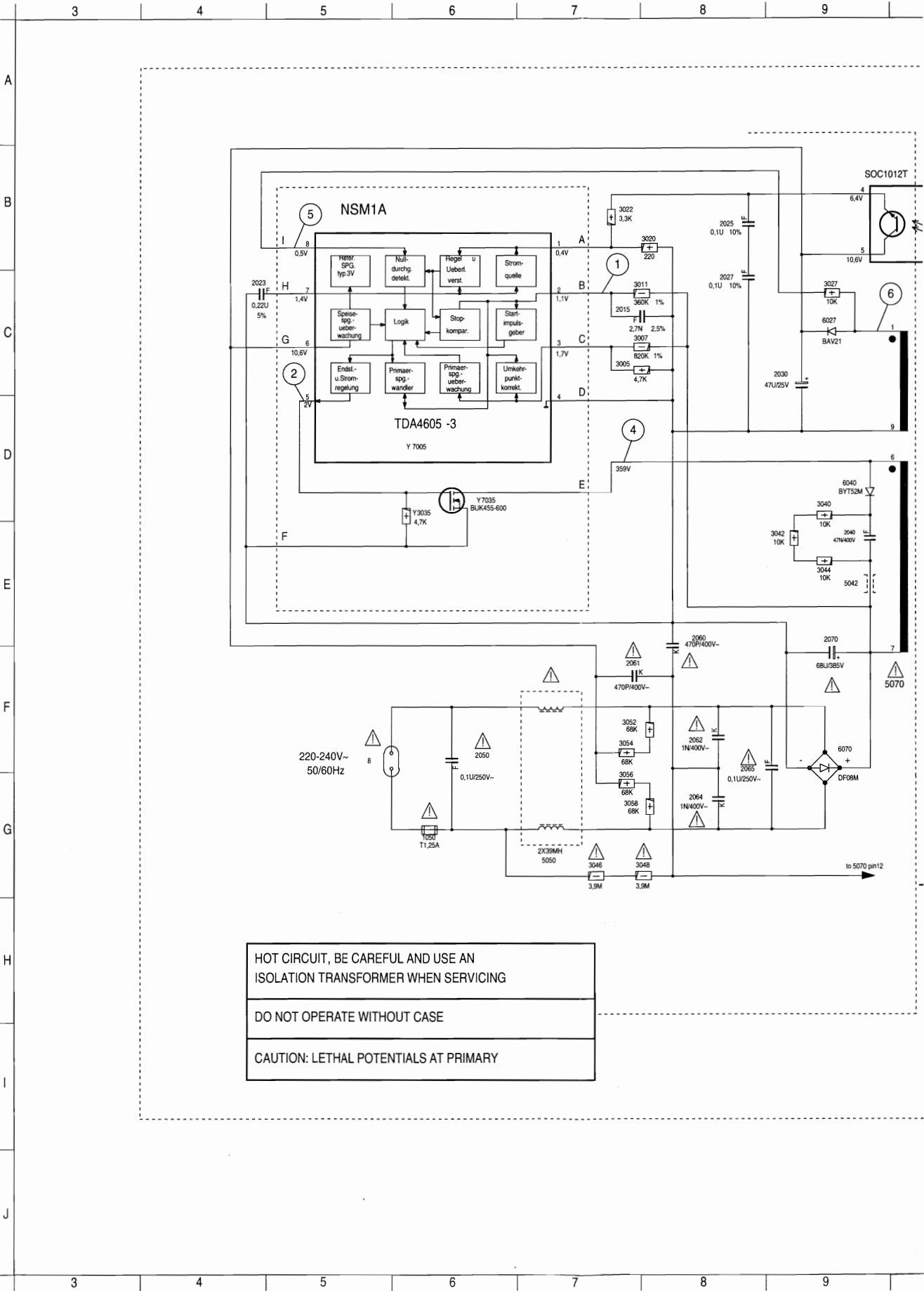
Osc

AC. 2
IC 70AC. 1
7035DC. 5
IC 70DC. 5
5070A: A
IC 70A: D
IC 7

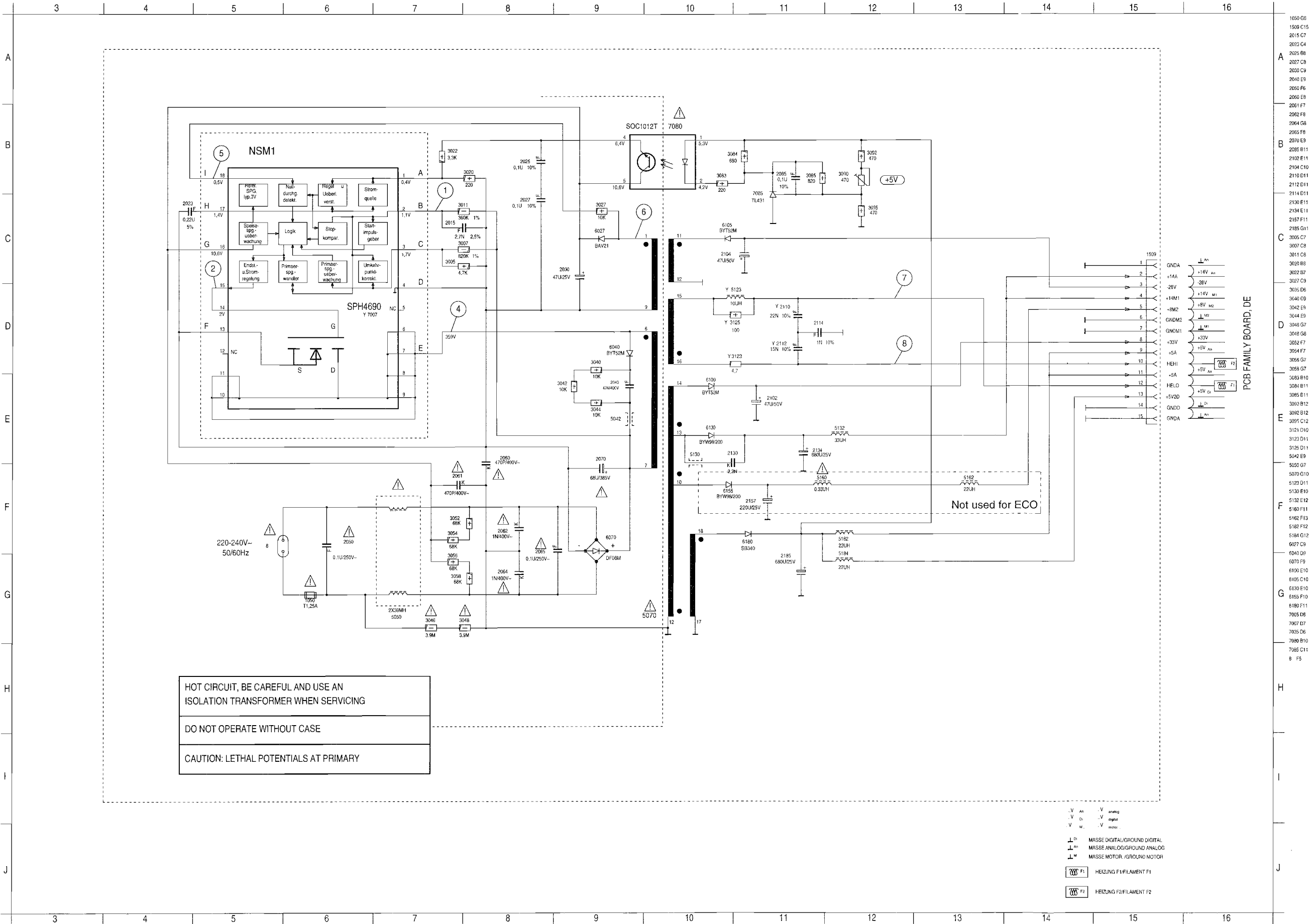
Power Supply NSM1 (PS)



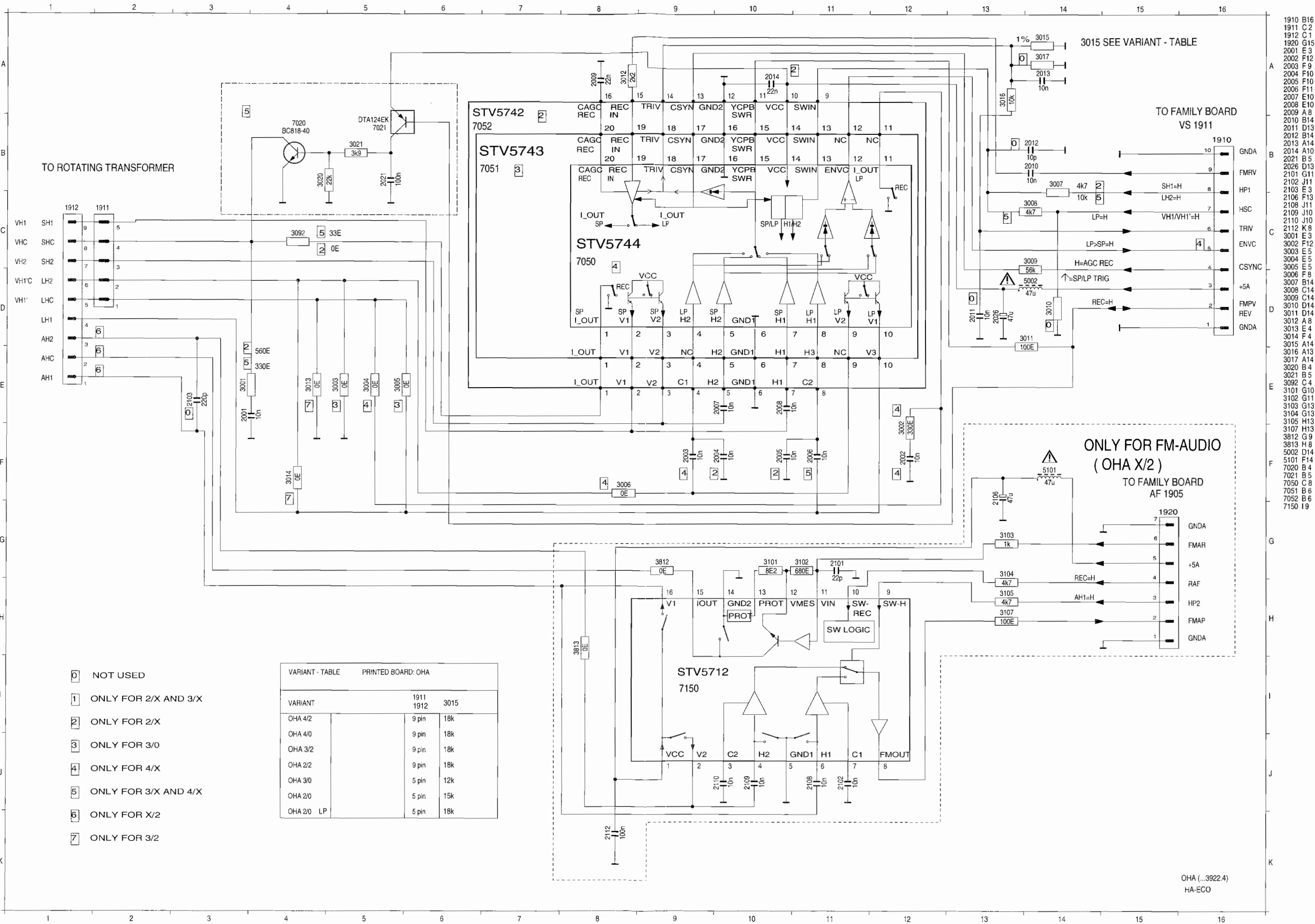
Power Supply NSM1 (PS)
(Version with TDA4605 IC7005, primary part)



Power Supply NSM1 (PS)
(Version with SPH4690 IC7007)



Head Amplifier OHA4/2



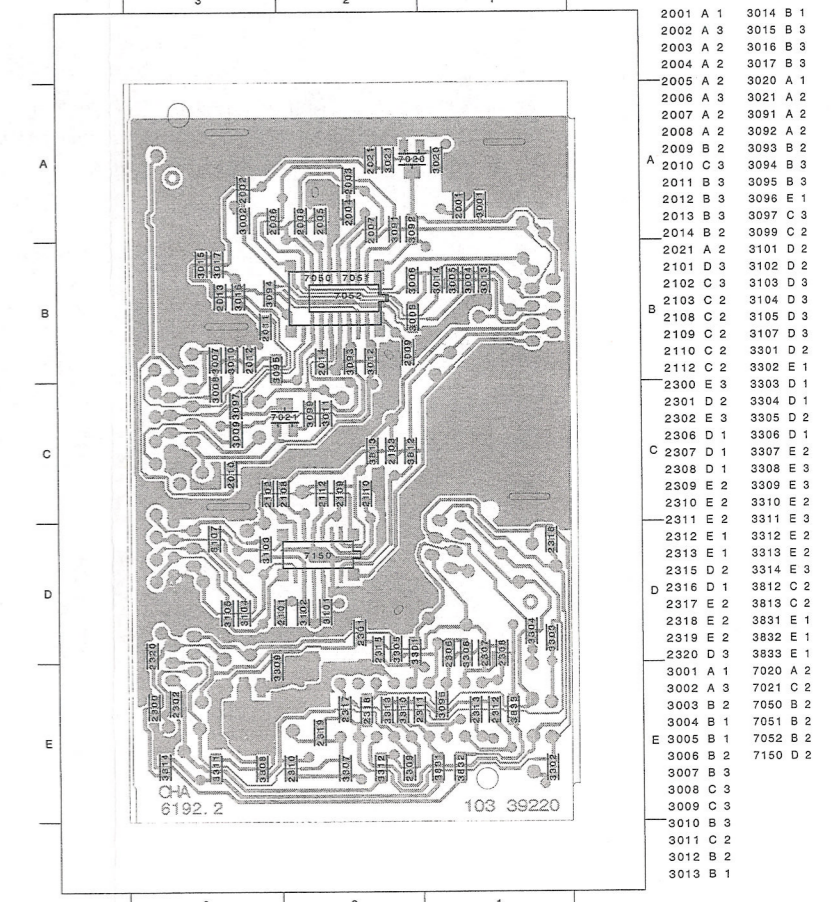
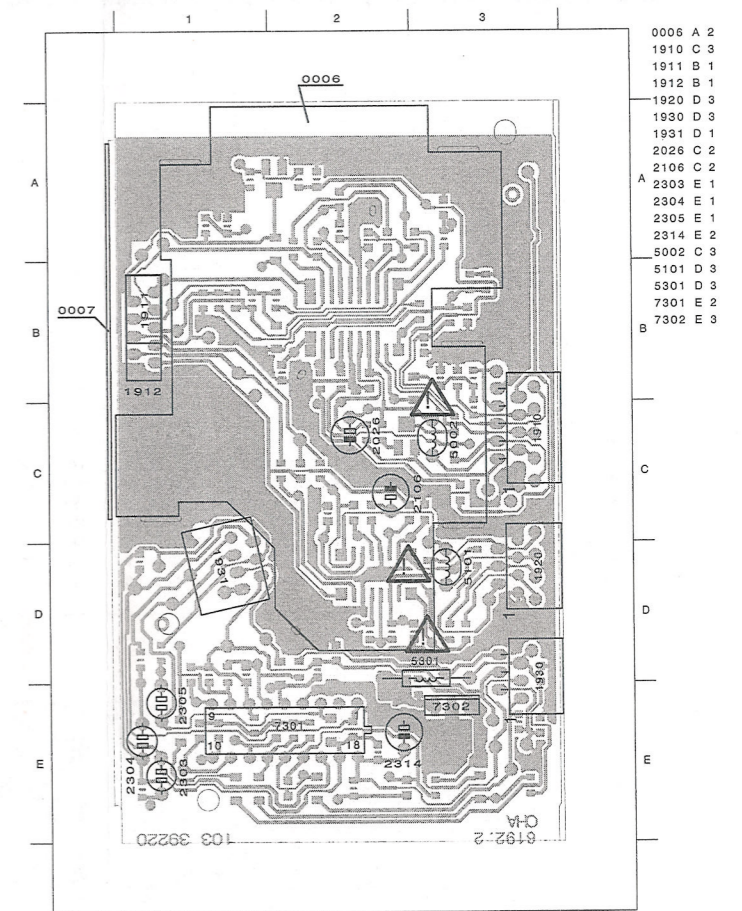
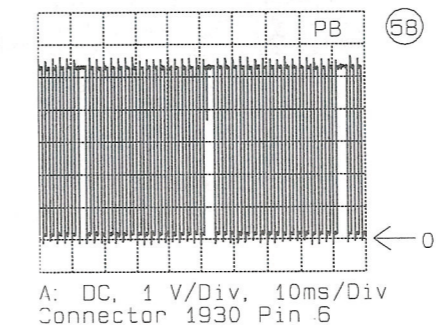
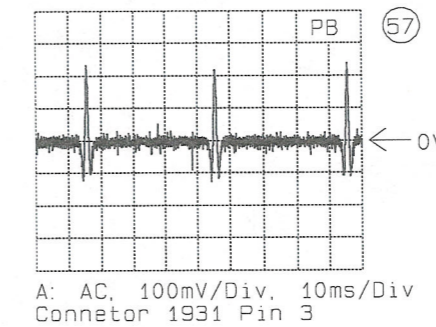
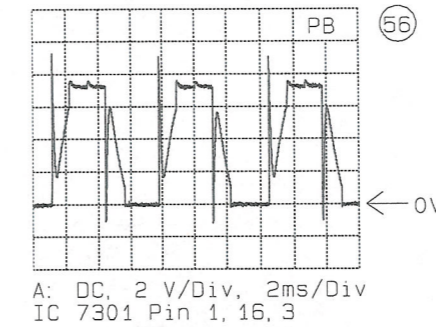
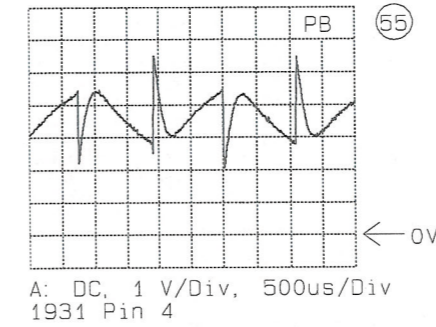
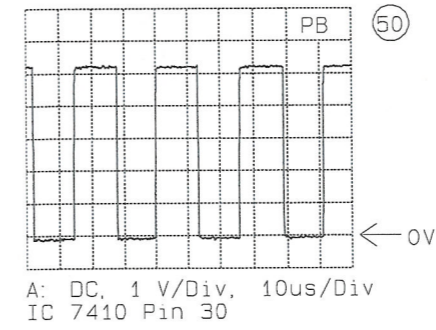
0 NOT USED
4 ONLY FOR 4/X

OSCILLOGRAMS

TO SCANNER MOTOR

TO FAMILYBOARD DE 1915

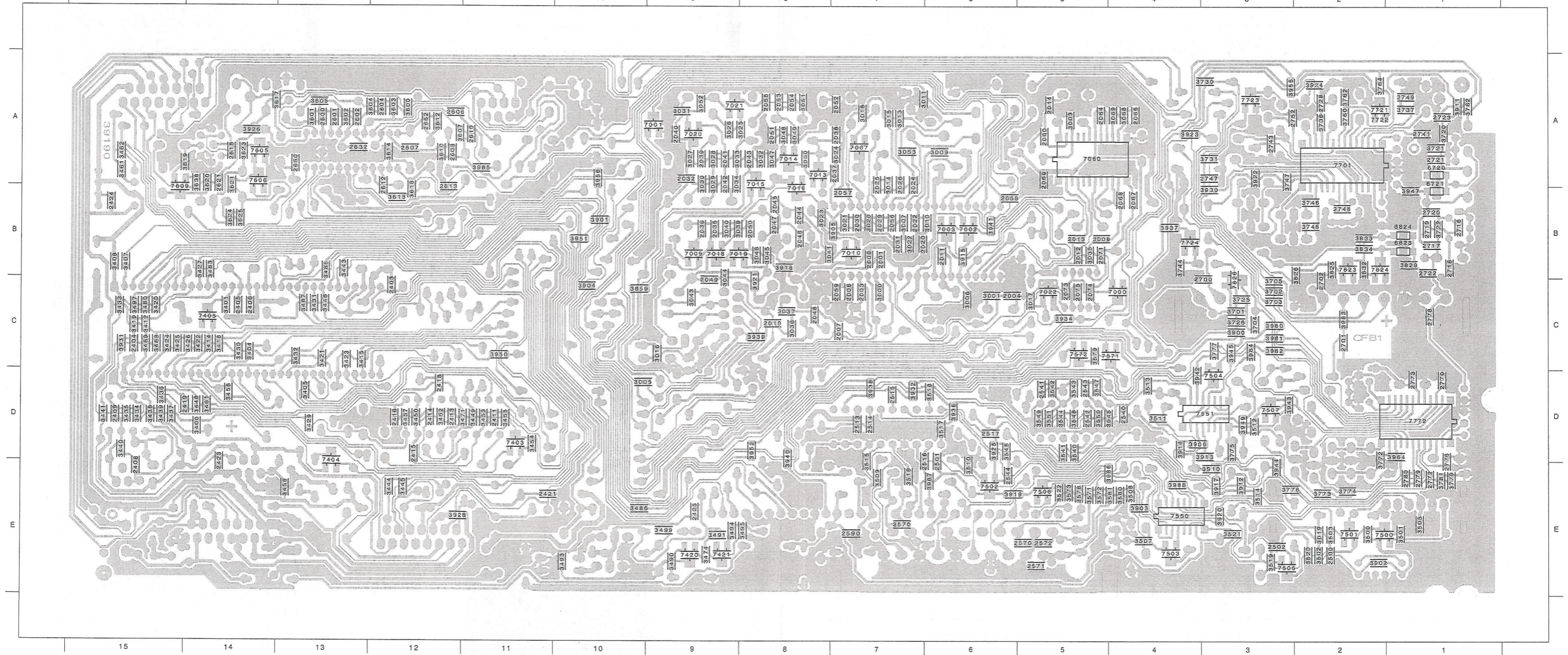
OHA (...3922.4)
DE-ECO



Family Board OFB

"Inserted components are dependent on the set type"

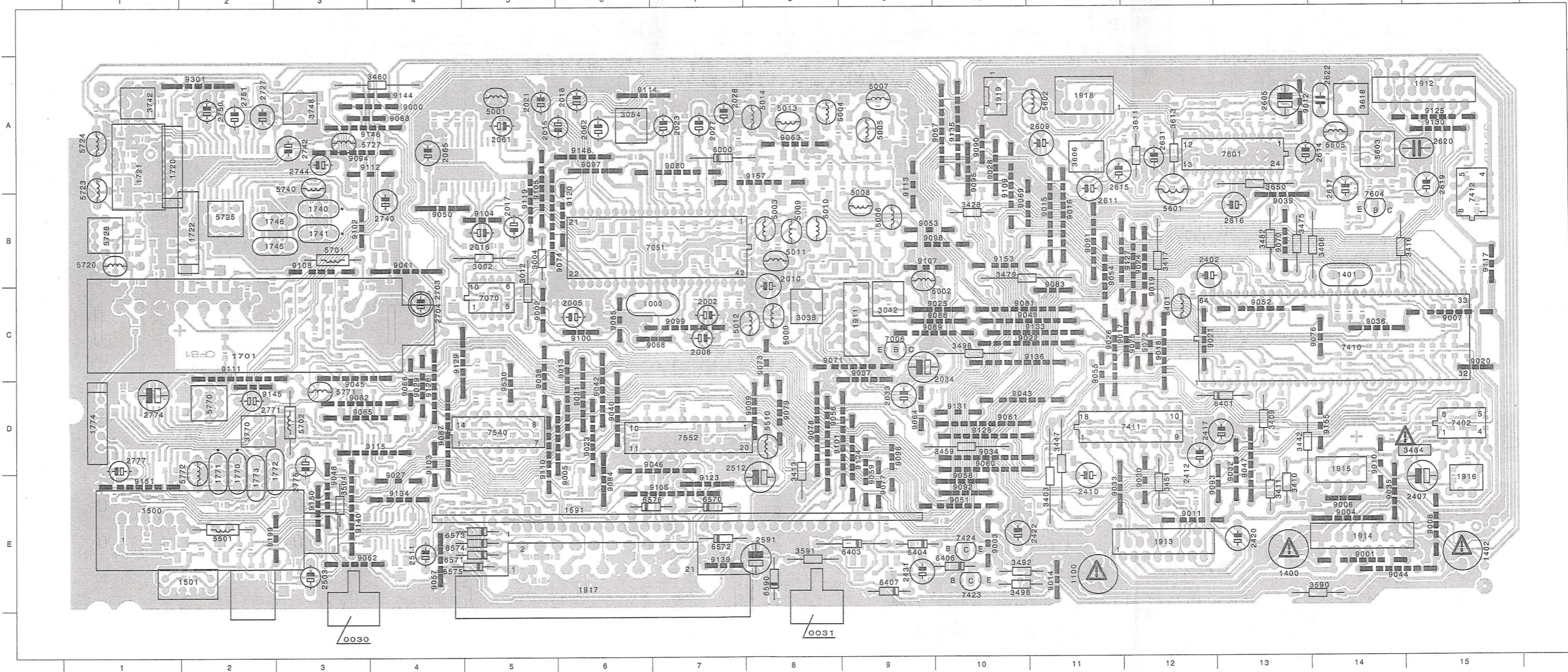
2001 B 7	2031 B 7	2051 A 8	2075 C 5	2500 E 2	2601 A 13	2717 B 1	2778 C 1	3018 A 7	3036 C 8	3400 D 14	3427 B 14	3448 D 14	3486 E 10	3509 E 7	3544 D 5	3602 A 13	3701 C 3	3760 A 2	3859 C 10	3921 C 8	3943 D 3	3987 E 6	7019 B 9	7550 E 4
2003 C 7	2032 A 9	2052 A 7	2403 C 12	2501 D 6	2602 A 13	2718 B 1	2779 E 1	3019 E 2	3037 C 8	3401 C 14	3429 D 13	3449 D 11	3487 C 13	3510 E 6	3545 D 4	3603 A 12	3702 C 3	3762 A 2	3900 C 3	3922 A 3	3944 E 3	3988 E 4	7020 A 9	7551 D 3
2004 C 6	2035 B 9	2053 A 8	2404 C 15	2502 E 3	2604 A 12	2719 B 1	2780 E 1	3020 B 7	3039 B 9	3404 C 14	3430 C 14	3450 D 12	3488 C 15	3511 D 4	3546 D 6	3604 A 12	3703 C 3	3764 A 2	3901 B 10	3923 A 4	3945 C 3	3989 E 4	7021 A 9	7551 D 3
2006 C 7	2036 B 9	2054 A 8	2405 C 14	2513 D 7	2606 A 12	2720 B 1	3000 C 7	3021 B 7	3040 B 9	3405 D 13	3431 C 13	3452 D 12	3489 C 15	3512 D 3	3547 D 5	3605 A 13	3704 C 3	3772 D 2	3902 E 2	3924 A 2	3947 B 1	3987 E 4	7022 C 5	7572 C 5
2007 C 7	2037 A 7	2055 A 8	2406 C 14	2514 D 7	2607 A 12	2721 A 1	3001 C 6	3022 B 7	3041 B 8	3407 B 15	3432 C 13	3453 D 11	3490 E 9	3513 D 4	3548 D 5	3607 A 12	3705 C 3	3773 E 2	3903 E 4	3925 D 6	3949 D 3	3988 E 4	7023 A 9	7571 C 4
2009 B 7	2038 A 7	2056 B 7	2408 E 15	2515 D 7	2608 A 12	2722 B 1	3003 A 5	3023 B 8	3043 C 9	3408 B 15	3433 C 15	3454 D 11	3491 E 9	3514 E 3	3549 D 5	3610 A 12	3720 A 1	3774 E 2	3904 C 10	3926 A 14	3950 C 11	3987 E 4	7024 A 9	7572 C 5
2011 B 6	2039 A 9	2057 B 7	2409 D 15	2516 D 6	2610 A 11	2723 A 1	3005 D 10	3024 A 7	3044 B 9	3412 C 15	3434 D 15	3455 D 11	3493 E 10	3515 E 7	3550 D 5	3612 A 12	3721 A 1	3775 D 3	3905 B 7	3928 E 12	3951 B 10	3988 E 4	7025 A 9	7573 C 5
2012 B 5	2040 A 9	2058 B 6	2411 D 11	2517 D 6	2612 B 12	2728 A 2	3006 C 6	3025 A 8	3045 B 8	3414 C 14	3435 D 15	3456 E 13	3494 E 9	3516 E 7	3551 D 5	3614 A 12	3722 B 1	3777 C 3	3906 D 4	3930 B 3	3952 D 8	3988 E 4	7026 A 9	7574 C 5
2013 B 5	2041 A 9	2059 C 7	2413 D 12	2540 D 4	2613 B 12	2741 A 1	3007 B 7	3026 A 9	3046 B 8	3415 C 13	3436 D 15	3457 D 12	3495 E 8	3517 D 6	3570 E 7	3615 B 12	3725 C 3	3778 E 3	3910 E 3	3931 C 15	3955 A 10	3988 E 4	7027 A 9	7575 C 5
2014 A 5	2042 A 9	2060 A 5	2414 D 12	2541 D 5	2618 A 14	2743 A 3	3008 B 5	3027 A 9	3047 A 8	3418 C 14	3437 D 15	3458 D 14	3497 C 15	3518 D 6	3571 E 5	3616 B 12	3726 C 3	3779 E 1	3911 A 1	3932 D 7	3956 A 10	3988 E 4	7028 A 9	7576 C 5
2019 C 8	2043 A 8	2064 A 5	2415 D 12	2542 D 5	2621 A 14	2747 A 4	3009 A 6	3028 A 9	3048 A 8	3419 C 15	3438 D 15	3461 A 15	3499 E 9	3519 E 3	3572 E 5	3617 A 14	3730 A 3	3781 E 1	3912 E 3	3934 C 5	3964 D 1	3988 E 4	7029 A 9	7577 C 5
2020 B 7	2044 B 8	2066 A 4	2416 D 12	2543 D 5	2632 A 13	2748 B 2	3010 B 6	3029 A 9	3049 A 8	3420 C 15	3439 D 15	3462 A 15	3500 E 2	3520 E 2	3573 E 5	3619 A 15	3731 A 3	3782 A 1	3913 D 3	3936 D 6	3980 C 3	3988 E 4	7030 A 9	7578 C 5
2022 B 7	2045 B 8	2067 B 4	2418 D 12	2544 E 6	2650 A 13	2749 A 1	3011 A 7	3030 A 9	3050 A 8	3421 C 13	3440 D 15	3471 D 11	3501 E 1	3521 E 3	3578 E 5	3620 A 14	3736 A 2	3825 B 2	3914 D 4	3937 B 4	3981 C 3	3988 E 4	7031 A 9	7579 C 5
2024 A 7	2046 B 8	2068 B 4	2419 D 14	2570 E 5	2652 A 12	2752 A 3	3013 A 7	3031 A 9	3051 A 8	3422 C 14	3441 D 15	3474 E 9	3502 E 2	3522 E 5	3579 C 5	3621 B 14	3737 A 1	3826 B 2	3915 B 6	3938 D 7	3982 C 3	3988 E 4	7032 A 9	7580 C 5
2025 A 7	2047 B 8	2069 A 5	2421 E 11	2571 E 5	2700 C 3	2770 D 1	3014 A 7	3032 A 8	3052 A 9	3423 C 13	3443 B 13	3480 C 15	3503 E 2	3540 D 5	3580 E 4	3623 A 14	3744 B 4	3829 B 1	3917 E 3	3939 C 8	3983 C 2	3988 E 4	7033 A 9	7581 C 5
2026 A 7	2048 C 8	2071 B 5	2423 E 14	2572 E 5	2701 C 2	2772 E 1	3015 A 7	3033 A 9	3053 A 7	3424 C 15	3444 E 12	3481 D 14	3505 E 1	3541 D 5	3581 E 4	3624 B 14	3745 B 2	3832 B 2	3918 B 8	3940 D 8	3984 C 3	3988 E 4	7034 A 9	7582 C 5
2029 B 7	2049 C 9	2073 C 5	2424 B 15	2590 E 7	2702 C 2	2773 D 1	3016 C 9	3034 A 9	3058 A 4	3425 C 15	3445 E 12	3483 B 14	3507 E 4	3542 D 5	3580 A 12	3625 B 14	3746 B 2	3833 B 2	3919 E 6	3941 B 6	3985 A 11	3988 E 4	7035 A 9	7583 C 5
2030 B 7	2050 B 8	2074 C 5	2425 E 9	2600 A 13	2716 B 1	2776 D 1	3017 C 5	3035 B 5	3069 A 4	3426 C 14	3446 C 13	3485 B 13	3508 E 4	3543 D 5	3601 A 13	3638 A 14	3747 A 3	3834 B 2	3920 E 3	3942 D 4	3986 E 4	3988 E 4	7036 A 9	7584 C 5



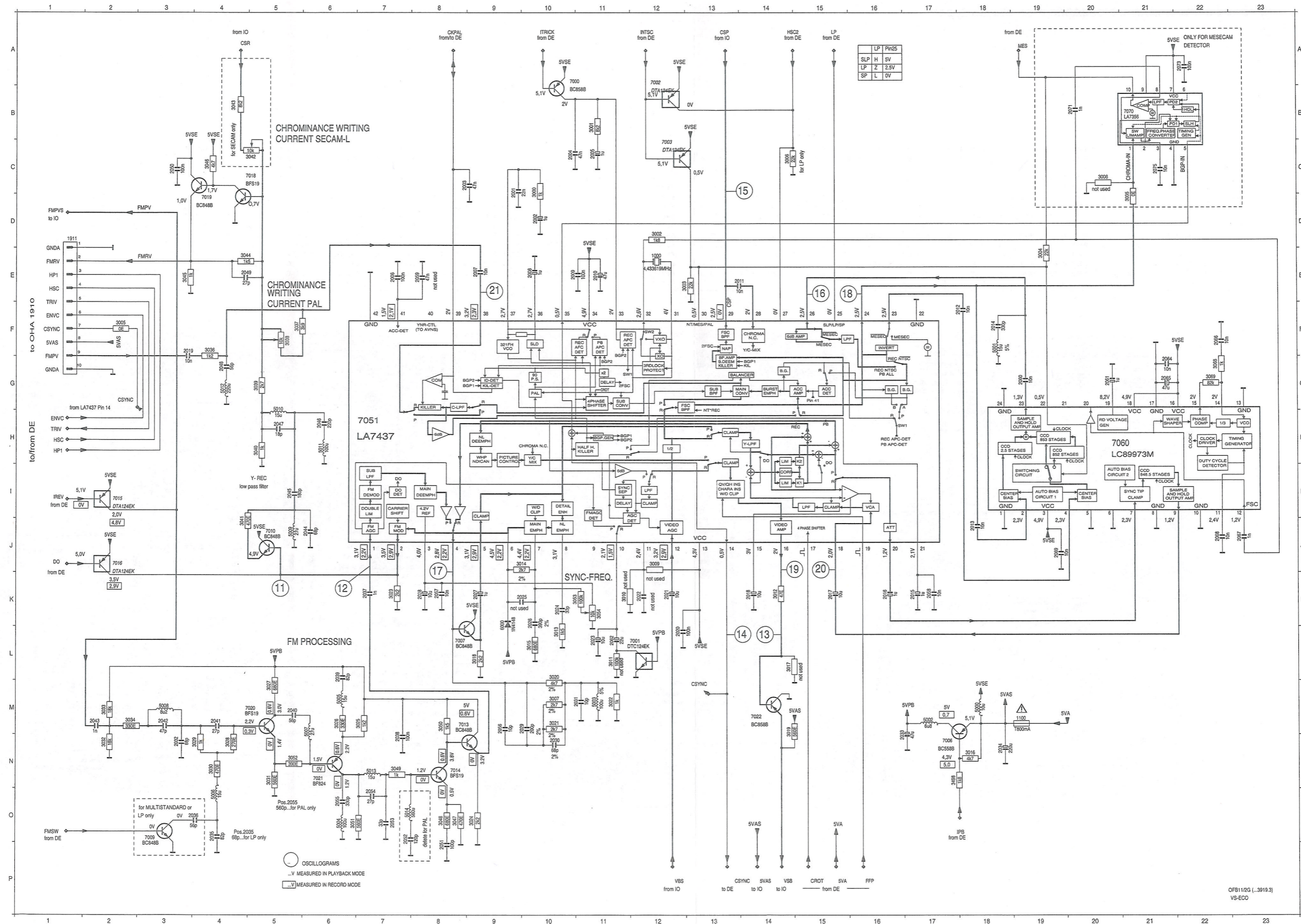
Family Board OFB

"Inserted components are dependent on the set type"

0030 E 3	1740 B 3	1916 E 15	2027 A 7	2431 E 9	2622 A 14	3002 B 5	3428 B 10	3590 E 14	5004 A 8	5601 B 12	5771 D 3	6576 E 6	7604 B 14	9013 D 6	9027 E 4	9041 B 4	9055 C 11	9069 B 11	9083 C 11	9097 A 6	9111 C 2	9129 C 4	9151 E 1						
0031 E 8	1741 B 3	1917 E 6	2028 A 7	2503 E 3	2631 A 12	3004 B 5	3442 D 13	3591 E 8	5005 A 9	5602 A 11	5772 D 2	6590 E 8	9000 A 4	9014 E 11	9028 A 10	9042 D 6	9056 D 8	9070 B 13	9084 E 6	9098 B 10	9112 A 4	9130 A 15	9153 B 10						
1000 C 7	1745 B 3	1918 A 11	2033 D 9	2511 E 4	2703 C 4	3012 C 5	3447 D 11	3606 A 11	5006 B 9	5603 A 14	6000 A 7	7006 C 9	9001 E 14	9015 B 11	9029 D 4	9043 D 10	9057 E 4	9071 C 9	9085 C 6	9099 C 7	9113 A 9	9131 D 10	9155 D 14						
1100 E 11	1746 B 3	1919 A 10	2034 C 9	2512 E 8	2704 C 4	3038 C 8	3451 E 12	3611 A 12	5007 A 9	5605 A 14	6401 D 13	7051 B 7	9002 C 5	9016 B 11	9030 E 12	9044 E 14	9058 E 10	9072 C 12	9086 C 10	9100 C 6	9114 A 6	9133 C 11	9157 A 8						
1400 E 13	1770 D 2	2002 C 7	2061 A 5	2591 E 8	2727 A 2	3042 C 9	3459 D 10	3613 A 12	5008 B 9	5701 B 3	6403 E 9	7070 C 5	9003 E 10	9017 C 12	9031 D 6	9045 C 3	9059 E 9	9073 C 8	9087 D 4	9101 D 9	9115 D 4	9134 E 4	9199 E 2						
1401 B 14	1771 D 2	2005 C 6	2062 A 6	2605 A 13	2740 B 4	3054 A 6	3460 A 4	3618 A 14	5009 B 8	5702 D 3	6404 E 9	7402 D 15	9004 E 14	9018 C 12	9032 E 13	9046 D 7	9060 D 10	9074 B 5	9088 A 3	9102 B 3	9117 B 15	9135 A 10	9301 A 2						
1402 E 15	1772 D 2	2008 C 7	2065 A 4	2609 A 11	2742 A 3	3403 E 11	3475 B 13	3650 A 13	5010 B 8	5720 B 1	6406 E 10	7410 C 14	9005 D 6	9019 B 12	9033 E 11	9047 D 13	9061 D 10	9075 C 12	9089 C 9	9103 D 4	9119 B 5	9136 C 10	9530 D 5						
1500 E 2	1773 E 2	2010 C 8	2402 B 12	2611 A 11	2744 A 3	3406 B 14	3479 B 10	3742 A 1	5011 B 8	5723 A 1	6407 E 9	7411 D 12	9006 E 14	9020 C 15	9034 D 10	9048 E 3	9062 E 3	9076 C 14	9090 A 10	9104 B 5	9120 B 6	9139 E 7							
1501 E 2	1774 D 1	2015 A 6	2407 E 15	2614 A 13	2750 A 2	3409 D 13	3482 B 13	3748 A 3	5012 C 8	5724 A 1	6570 E 7	7412 B 15	9007 C 15	9021 C 12	9035 E 14	9049 C 11	9063 A 8	9077 E 9	9091 B 11	9105 A 5	9123 E 7	9140 E 3							
1591 E 5	1911 C 9	2016 B 5	2410 E 11	2615 A 11	2751 A 2	3410 E 13	3484 D 15	3770 D 2	5013 A 8	5725 B 2	6571 E 5	7423 E 10	9008 E 15	9022 C 10	9036 C 14	9050 B 4	9064 D 9	9078 D 8	9092 E 10	9106 E 7	9124 D 9	9144 A 4							
1701 C 2	1912 A 15	2017 B 5	2412 D 12	2616 B 13	2771 D 2	3411 E 13	3492 E 10	5000 C 8	5014 A 8	5726 B 1	6572 E 7	7424 E 10	9009 D 8	9023 D 6	9037 D 9	9051 E 10	9065 D 3	9079 D 8	9093 E 13	9107 B 9	9125 A 15	9145 D 2							
1720 A 1	1913 E 12	2018 A 6	2417 D 13	2617 B 14	2774 D 1	3413 D 8	3496 E 10	5001 A 5	5401 C 12	5727 A 3	6573 E 5	7540 D 5	9010 D 14	9024 B 12	9038 C 5	9052 C 13	9066 D 4	9080 A 7	9094 A 3	9108 B 3	9126 D 4	9146 A 3							
1721 A 1	1914 E 14	2021 A 5	2420 E 13	2619 A 15	2775 D 3	3416 B 14	3498 C 10	5002 B 9	5501 E 2	5740 A 3	6574 E 5	7552 D 7	9011 E 12	9025 C 10	9039 B 13	9053 B 9	9067 A 10	9081 C 10	9095 A 10	9109 A 10	9127 B 11	9148 A 6							
1722 B 2	1915 E 14	2023 A 7	2422 E 10	2620 A 15	2777 D 1	3417 B 12	3504 E 3	5003 B 8	5510 D 8	5770 D 2	6575 E 5	7601 A 13	9012 A 13	9026 C 11	9040 D 6	9054 B 11	9068 C 7	9082 D 3	9096 D 9	9110 D 5	9128 D 10	9150 E 3							
	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15

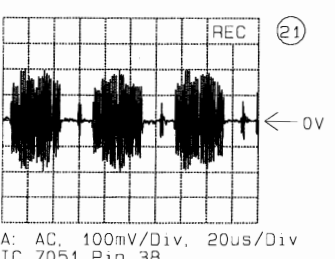
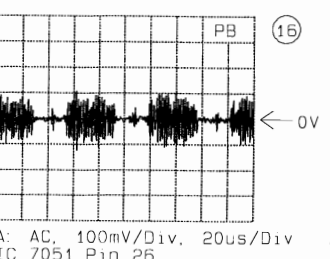
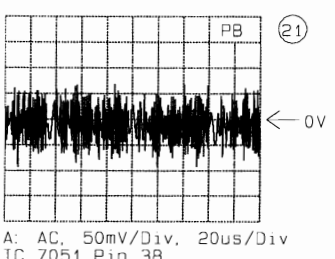
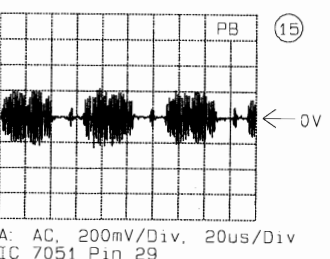
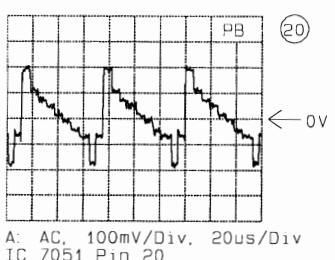
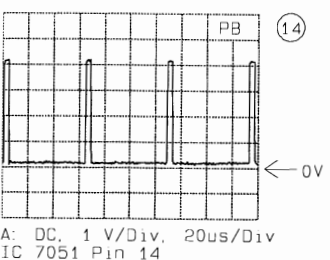
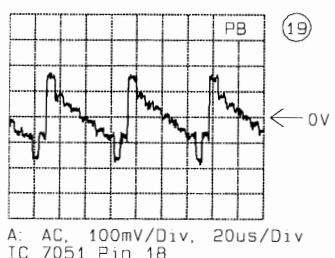
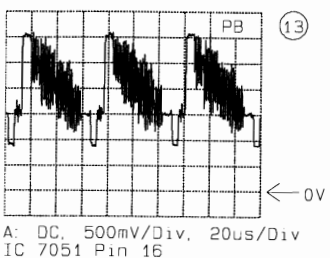
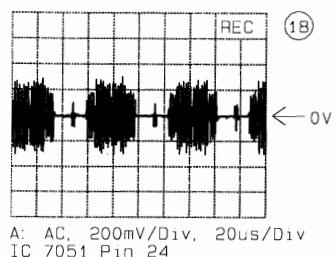
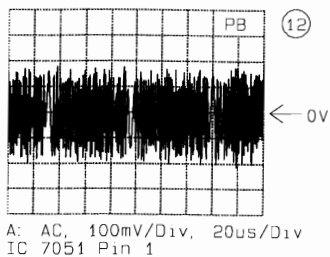
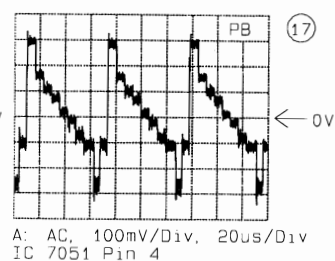
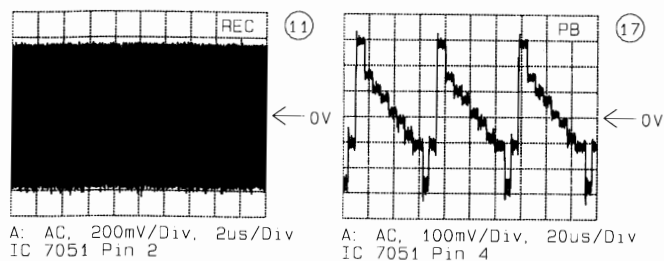


Family Board OFB - Video-Signal-Processing - VS

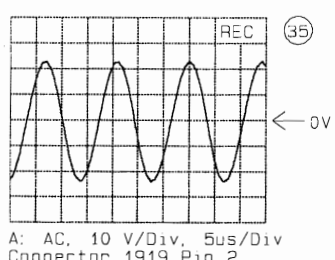
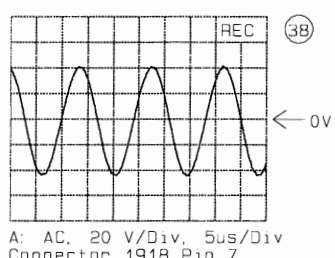
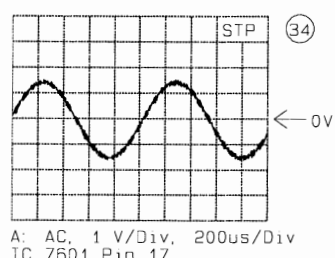
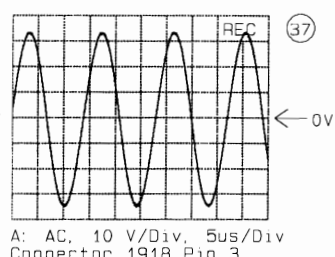
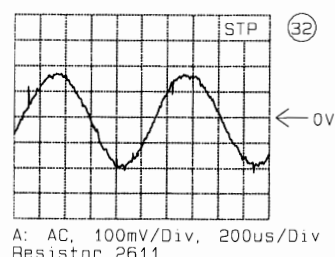
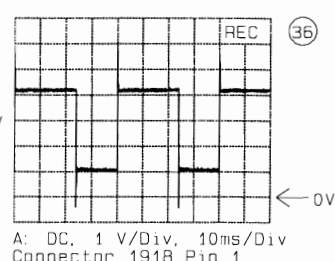
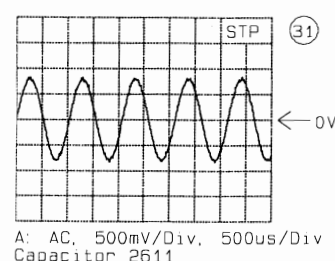


1000	E12	5008	M3
1100	M19	5009	J5
1911	D1	5010	H5
2001	C9	5011	H6
2002	D10	5012	G4
2003	C8	5013	N7
2004	C10	5014	O7
2005	C11	5000	K9
2006	E7	7000	A10
2007	E9	7001	L11
2008	E10	7002	A12
2009	E10	7003	B12
2010	E11	7008	N17
2011	E14	7007	L8
2012	F18	7009	O3
2013	J18	7010	J5
2014	F18	7013	M8
2015	K17	7014	N8
2016	K16	7015	I2
2017	K15	7016	J2
2018	K14	7018	C4
2019	F3	7019	D4
2020	L12	7020	M4
2021	K12	7021	N6
2022	K12	7022	K12
2023	L11	7023	H7
2024	K10	7060	H20
2025	K10	7070	B21
2026	K10		
2027	K9		
2028	K8		
2029	M10		
2030	N10		
2031	M11		
2032	N3		
2033	M16		
2034	N18		
2035	O4		
2036	O4		
2037	K7		
2038	N7		
2039	L6		
2040	M5		
2041	M4		
2042	M3		
2043	M2		
2044	J6		
2045	I5		
2046	H6		
2047	H5		
2048	G4		
2049	E4		
2050	O3		
2051	O8		
2052	O7		
2053	O7		
2054	O7		
2055	O8		
2056	M9		
2057	K8		
2058	K17		
2059	E8		
2060	G19		
2061	G20		
2062	L11		
2063	G21		
2064	G21		
2065	G21		
2066	F22		
2067	J23		
2068	J22		
2069	J19		
2070	B20		
2071	B20		
2072	A22		
2073	A22		
2074	C21		
2075	C21		
2076	C10		
2077	B11		
2078	D12		
2079	E13		
2080	E19		
2081	F2		
2082	C14		
2083	M10		
2084	C20		
2085	J12		
2086	K11		
2087	L11		
2088	K14		
2089	L10		
2090	L10		
2091	L14		
2092	L9		
2093	M14		
2094	L10		
2095	M10		
2096	M11		
2097	K7		
2098	O9		
2099	M7		
2100	M6		
2101	M5		
2102	N4		
2103	N4		
2104	N4		
2105	N5		
2106	N2		
2107	M2		
2108	D21		
2109	F4		
2110	F5		
2111	F5		
2112	G5		
2113	H5		
2114	L4		
2115	C5		
2116	B4		
2117	E4		
2118	E3		
2119	C4		
2120	O8		
2121	O8		
2122	O8		
2123	N7		
2124	M8		
2125	O6		
2126	N5		
2127	K11		
2128	K11		
2129	G22		
2130	G22		
2131	N17		
2132	M18		
2133	F18		
2134	M17		
2135	M11		
2136	O6		
2137	O6		
2138	O6		
2139	O6		
2140	O6		
2141	O6		
2142	O6		
2143	O6		
2144	O6		
2145	O6		
2146	O6		
2147	O6		
2148	O6		
2149	O6		
2150	O6		

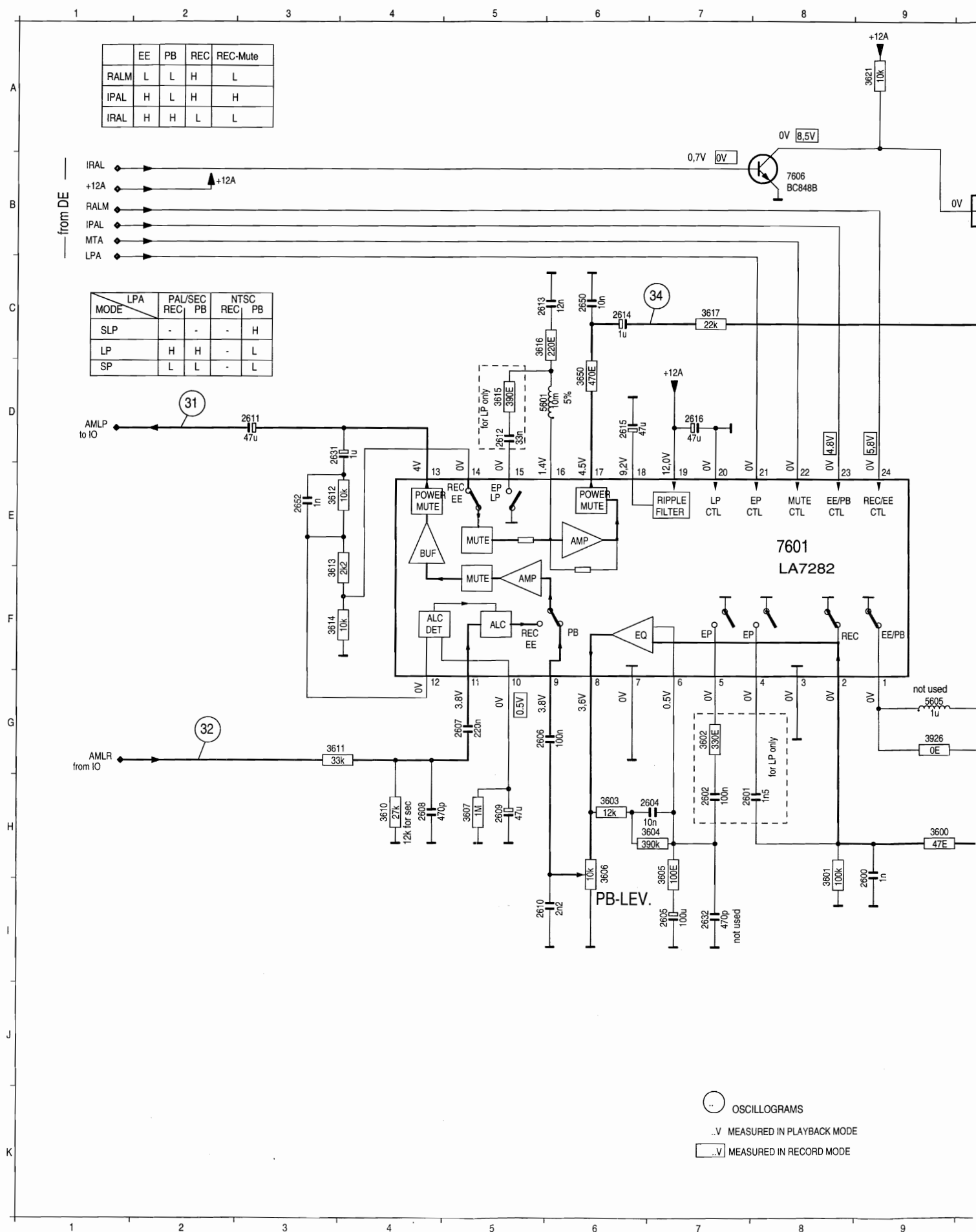
Oscillograms VS



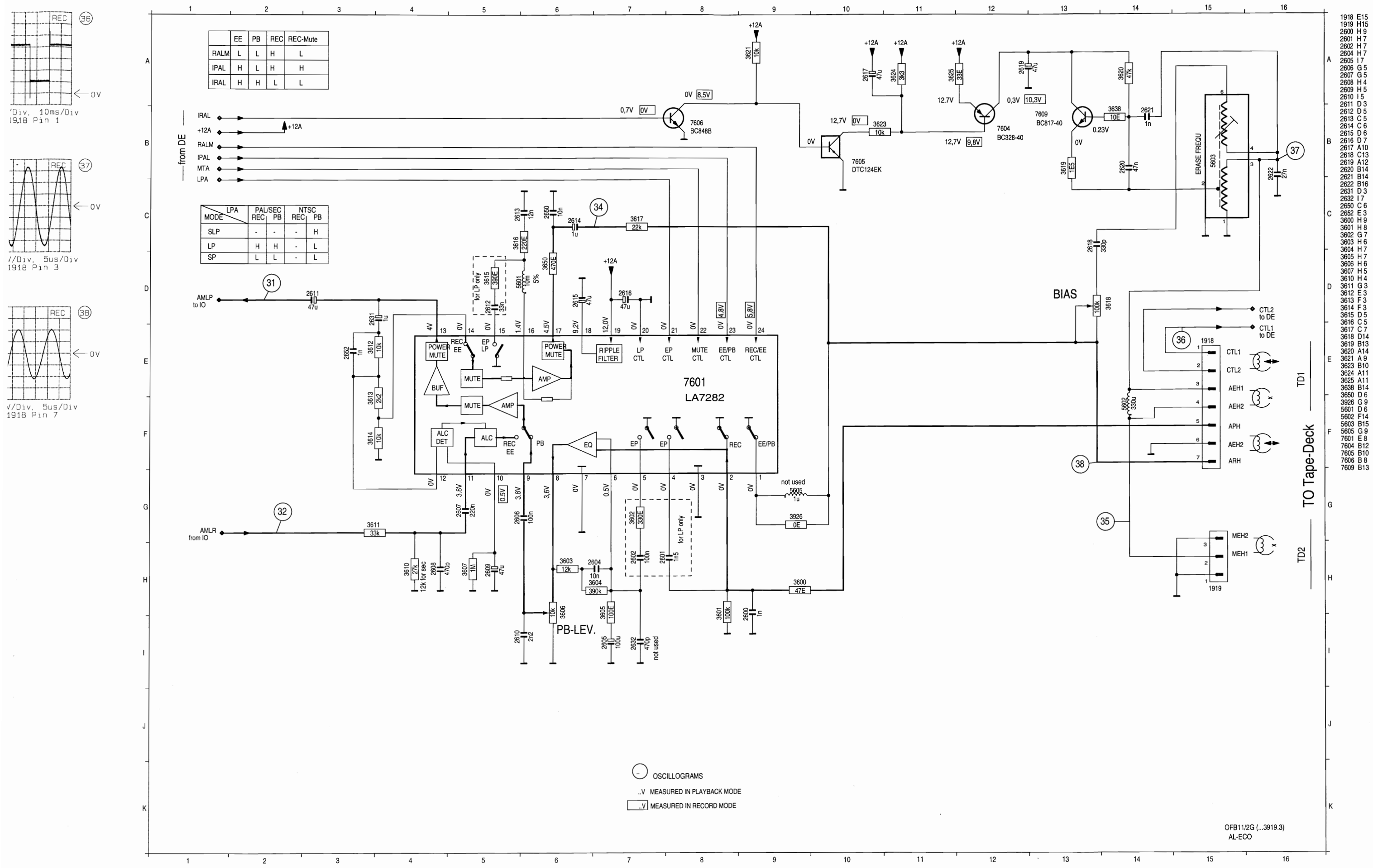
Oscillograms AL



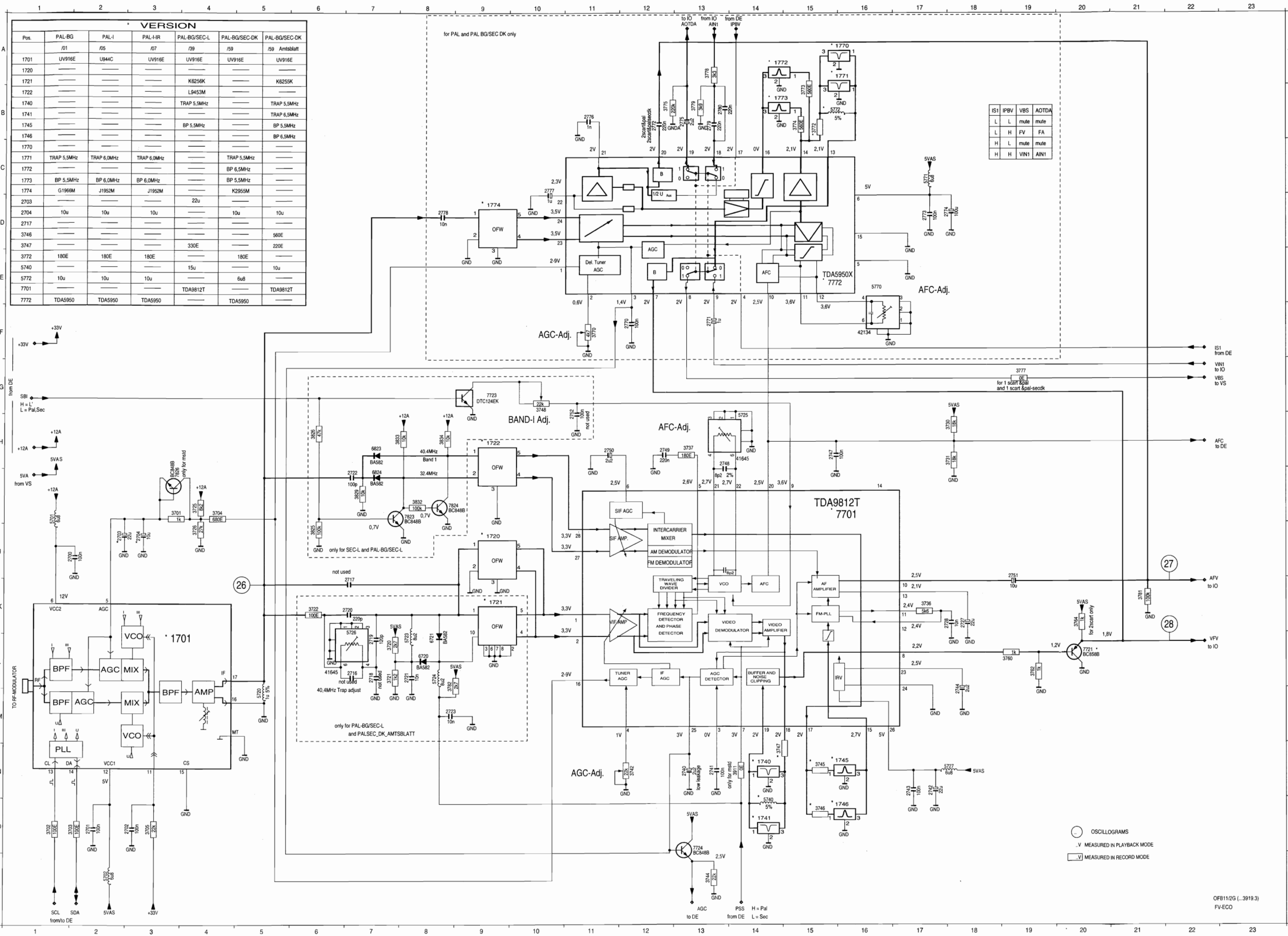
Family Board OFB - Audio Linear - AL



Family Board OFB - Audio Linear - AL

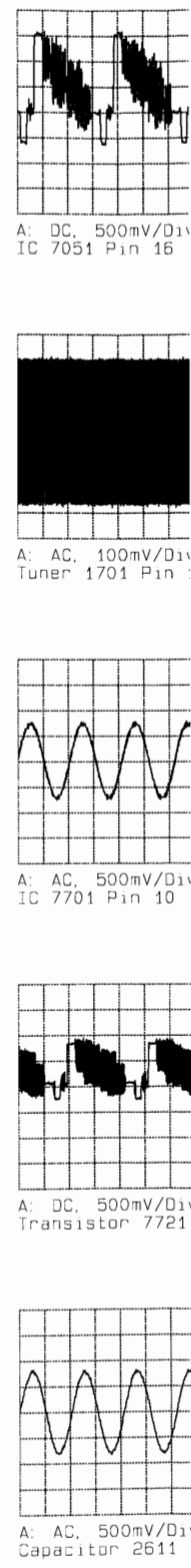


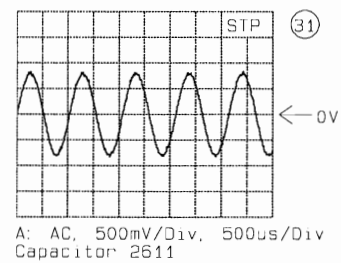
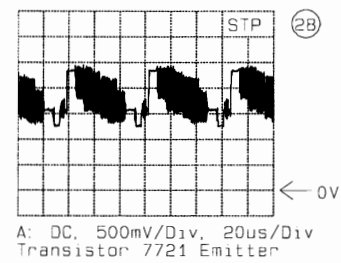
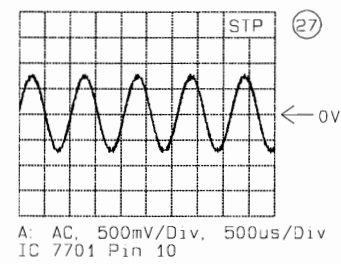
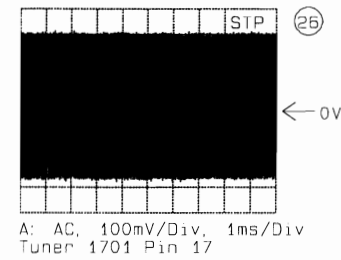
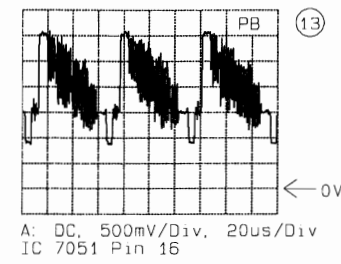
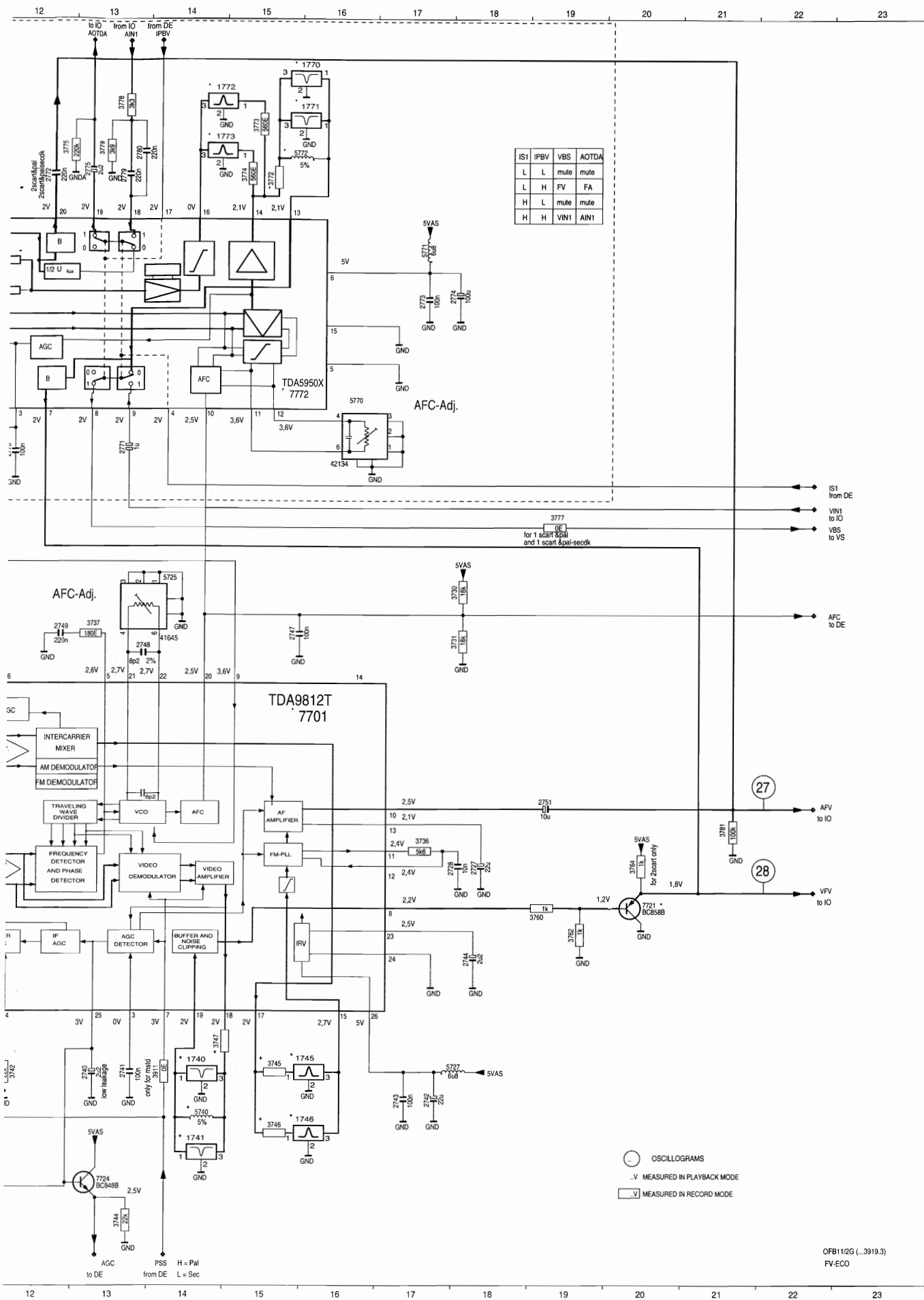
Family Board OFB - Frontend - FV



VERSION					
Pos.	PAL-BG	PAL-I	PAL-IIR	PAL-BG/SEC-L	PAL-BG/SEC-DK
1701	UV916E	U844C	UV916E	UV916E	UV916E
1720					
1721				K8256K	K8256K
1722				L9453M	
1740				TRAP 5.5MHz	TRAP 5.5MHz
1741					TRAP 6.5MHz
1745				BP 5.5MHz	BP 5.5MHz
1746					BP 6.5MHz
1770					
1771	TRAP 5.5MHz	TRAP 6.0MHz	TRAP 6.0MHz		TRAP 5.5MHz
1772					BP 6.5MHz
1773	BP 5.5MHz	BP 6.0MHz	BP 6.0MHz		BP 5.5MHz
1774	G1966M	J1952M	J1952M		K2955M
2703				22u	
2704	10u	10u	10u		10u
2717					
3748					560E
3747				330E	220E
3772	180E	180E	180E		180E
5740				15u	10u
5772	10u	10u	10u		6u8
7701				TDA9812T	TDA9812T
7772	TDA5950	TDA5950	TDA5950		TDA5950

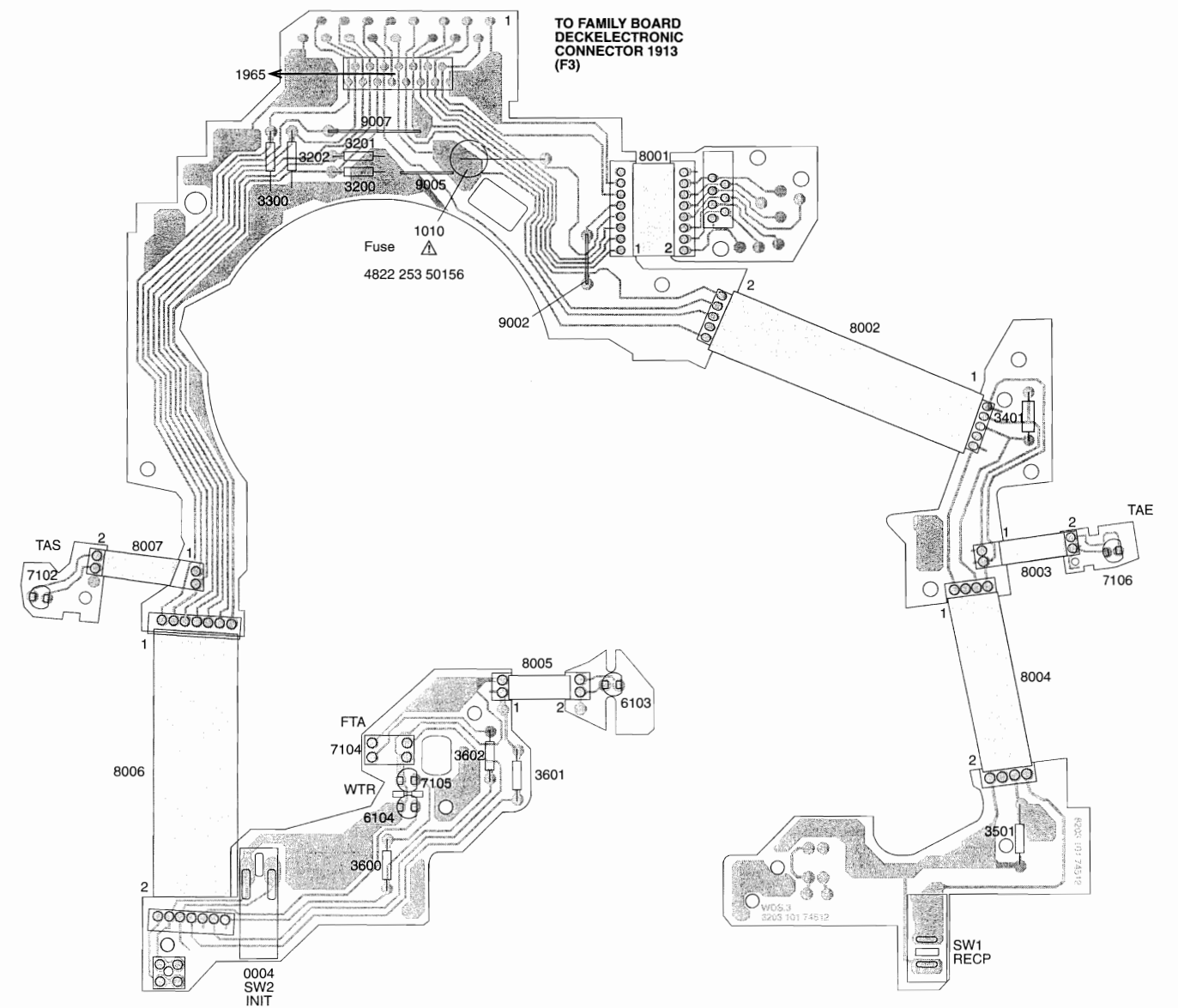
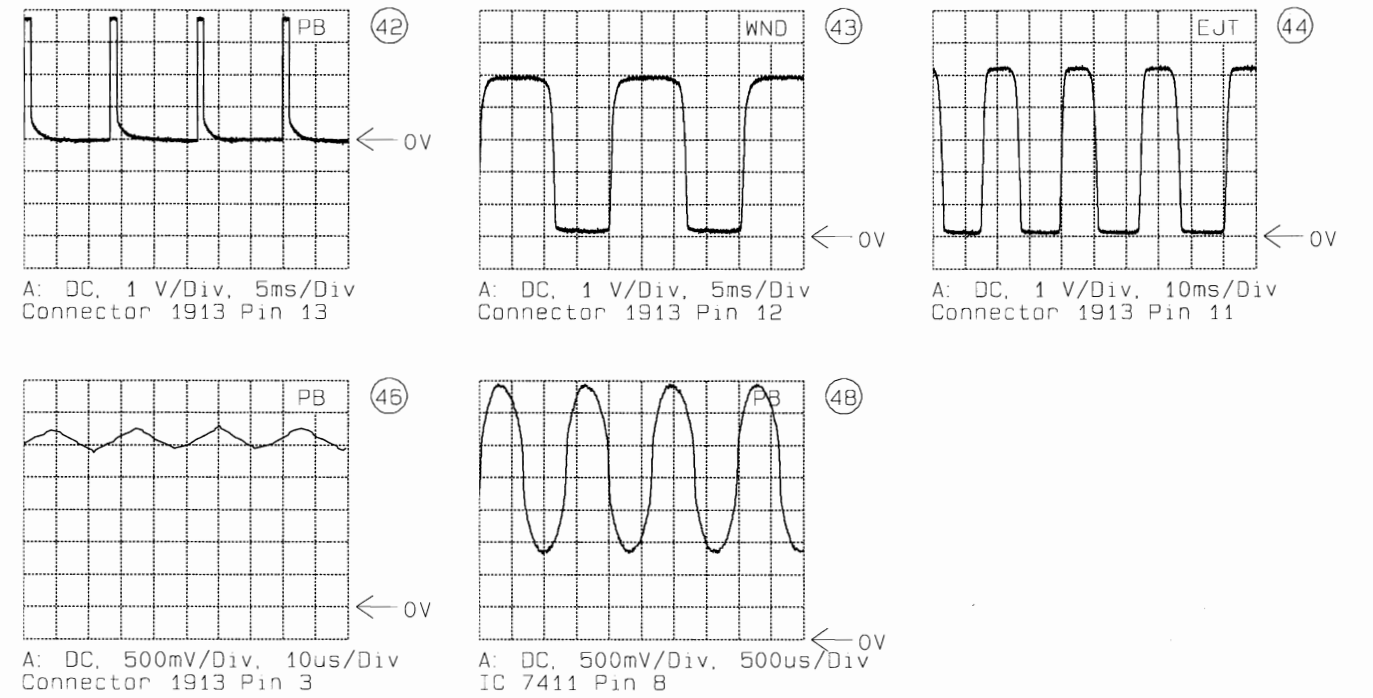
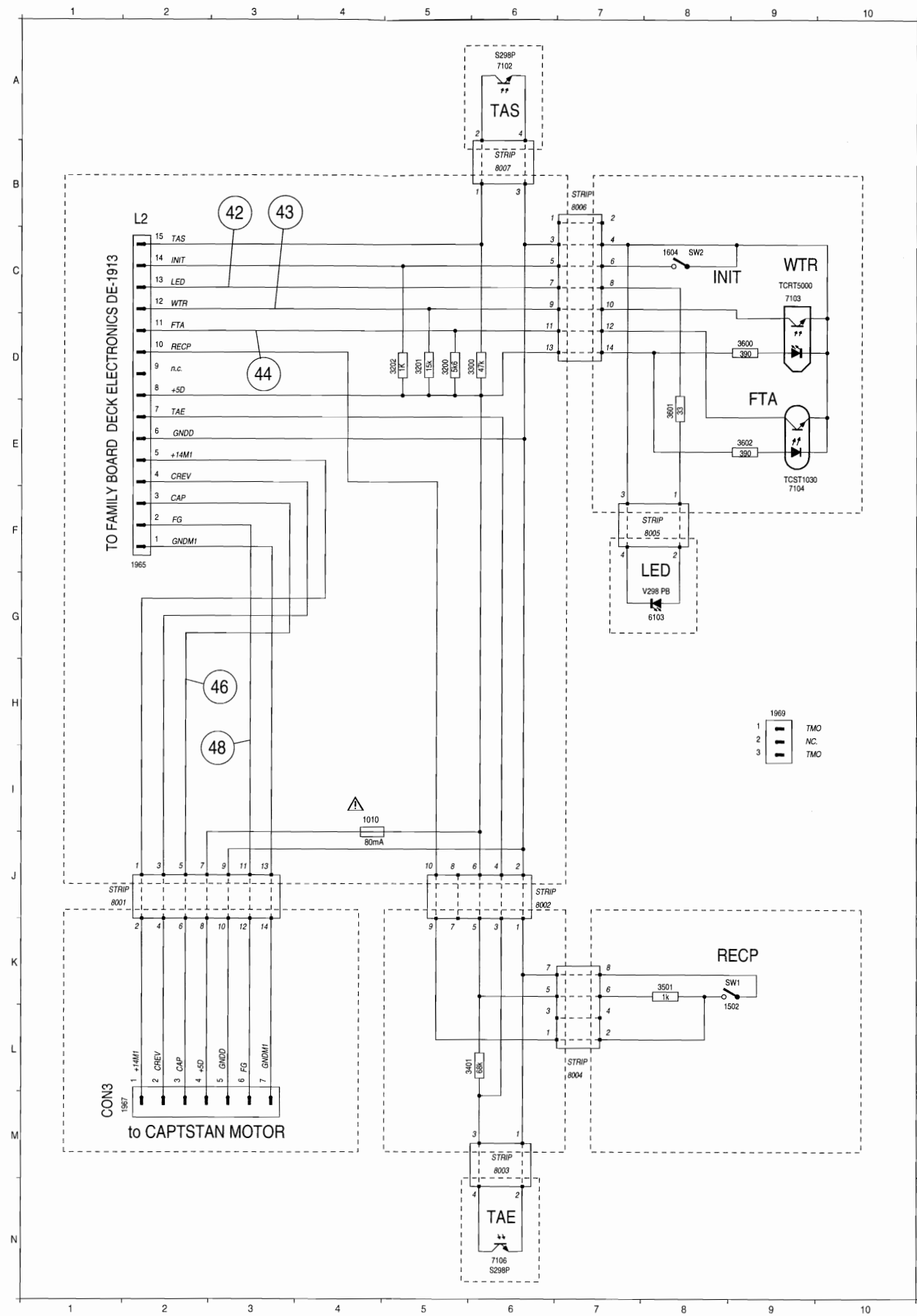
- 1701 L3
- 1720 J9
- 1721 K9
- 1722 H9
- 1740 N14
- 1741 O14
- 1745 N15
- 1746 O15
- 1770 A16
- 1771 A16
- 1772 A15
- 1773 B15
- 1774 D9
- 2700 J2
- 2701 O2
- 2702 O3
- 2703 J2
- 2704 J3
- 2716 L7
- 2717 K7
- 2718 L7
- 2719 L7
- 2720 K7
- 2721 L8
- 2722 I7
- 2723 M8
- 2727 K18
- 2728 K18
- 2740 N13
- 2741 N13
- 2742 N17
- 2743 N17
- 2744 M18
- 2747 H15
- 2748 H13
- 2749 H12
- 2750 H11
- 2751 K19
- 2752 H11
- 2770 F12
- 2771 F13
- 2772 B12
- 2773 D17
- 2774 D18
- 2775 B13
- 2776 B11
- 2777 C10
- 2778 D8
- 2779 B13
- 2780 B13
- 3701 I3
- 3702 O1
- 3703 O2
- 3704 I4
- 3705 O3
- 3720 L7
- 3721 L7
- 3722 K6
- 3725 I4
- 3726 J4
- 3730 H18
- 3731 H18
- 3736 K17
- 3737 H13
- 3742 N12
- 3744 P13
- 3745 N15
- 3746 O15
- 3747 N14
- 3748 G10
- 3760 L19
- 3762 L19
- 3764 K20
- 3770 F11
- 3772 B15
- 3773 B15
- 3774 B15
- 3775 B12
- 3777 G19
- 3778 A13
- 3779 B13
- 3781 K21
- 3782 L8
- 3825 J6
- 3826 H6
- 3829 I7
- 3832 I8
- 3833 H7
- 3834 H8
- 3911 N14
- 5701 I1
- 5702 P2
- 5720 M5
- 5723 L8
- 5724 L8
- 5725 H14
- 5726 L7
- 5727 N18
- 5740 O14
- 5770 E16
- 5771 C17
- 5772 B15
- 6720 L8
- 6721 L8
- 6823 H7
- 6824 I7
- 7701 I15
- 7721 L20
- 7722 M20
- 7723 G9
- 7724 O13
- 7772 E15
- 7823 I8
- 7824 I8
- 7826 I3



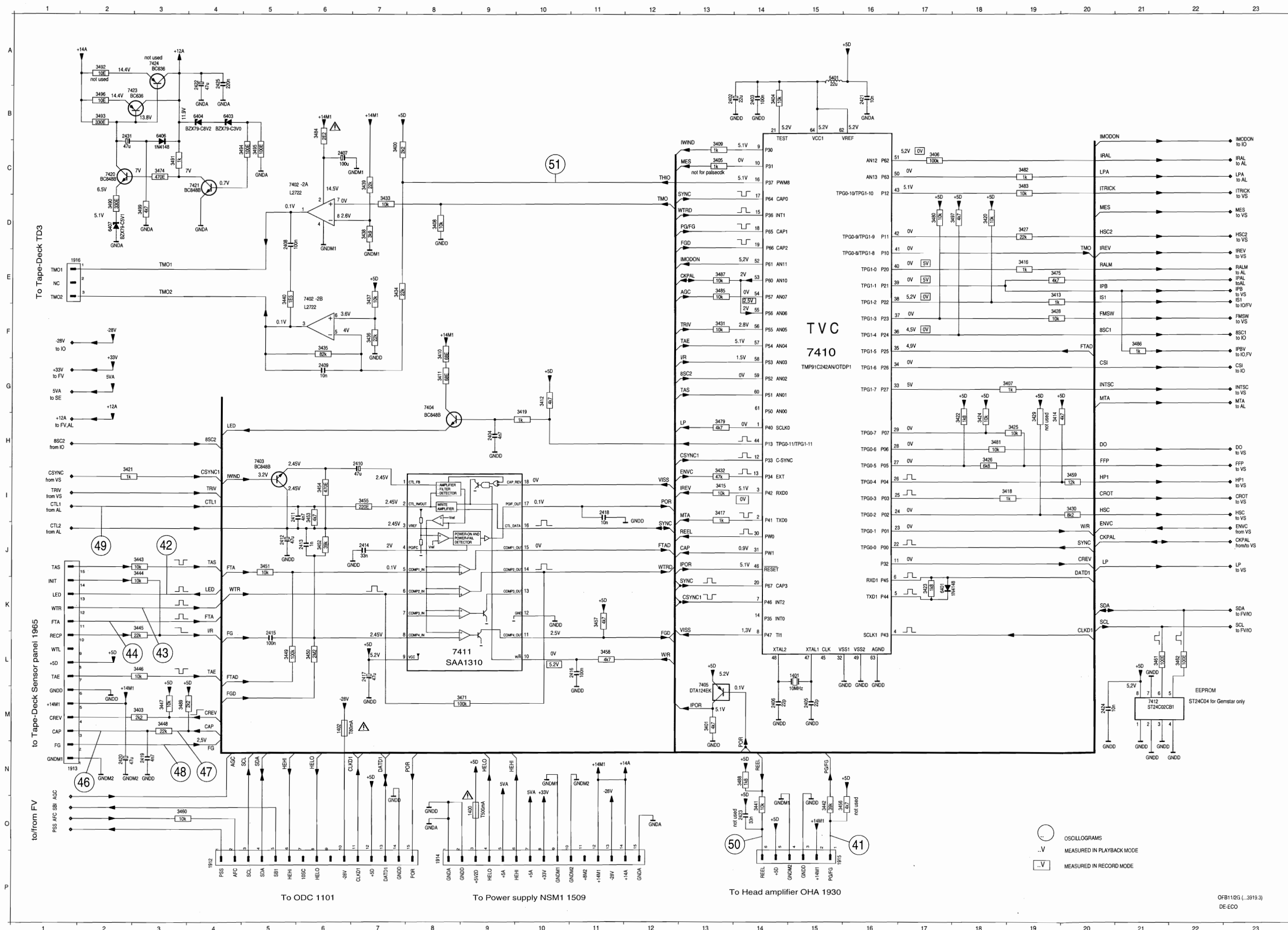


Remarks:

[illegible]



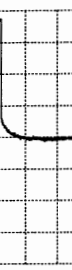
Family Board OFB - Deck-Electronics - DE



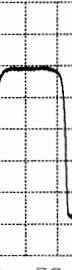
1400 O 9
1401 L15
1402 M 6
1912 P 4
1913 N 2
1914 P 8
1915 P15
1916 E 2
2402 B13
2403 B14
2404 H 9
2405 M15
2406 M14
2407 C 6
2408 D 5
2409 G 6
2410 H 7
2411 I 5
2412 J 5
2413 J 6
2414 J 7
2415 L 5
2416 L11
2417 L 7
2418 I11
2419 N 3
2420 N 2
2421 B16
2422 A 4
2423 O14
2424 M20
2425 A 4
2431 B 2
3400 C 7
3401 M13
3403 M 3
3404 B14
3405 C13
3406 C17
3407 G19
3408 D 8
3409 C13
3410 F 8
3411 G 8
3412 G10
3413 E19
3414 H19
3415 I13
3416 E19
3417 I13
3418 I19
3419 G10
3420 D18
3421 I 2
3422 H18
3423 K17
3424 H18
3425 H19
3426 H18
3427 D19
3428 F19
3429 H19
3430 I20
3431 F13
3432 I13
3433 D 7
3434 E 7
3435 F 6
3436 F 7
3437 E 7
3438 C 7
3439 C 7
3440 E 5
3441 O14
3442 O15
3443 J 3
3444 J 3
3445 K 3
3446 L 3
3447 M 3
3448 M 3
3449 L 5
3450 L 6
3451 J 5
3452 J 6
3453 I 6
3454 I 6
3455 I 7
3456 O15
3457 K11
3458 L11
3459 I20
3460 O 3
3461 L21
3462 L22
3463 M 9
3464 C 3
3465 E19
3466 H13
3467 D17
3468 H18
3469 C19
3470 C19
3471 E13
3472 E13
3473 M14
3474 M 3
3475 D 2
3476 C 3
3477 A 2
3478 B 2
3479 C 4
3480 C 5
3481 B 2
3482 D18
3483 D 3
3484 A15
3485 K17
3486 B 4
3487 B 4
3488 B 3
3489 D 2
3490 C 4
3491 C 4
3492 B 2
3493 B 2
3494 C 4
3495 C 5
3496 B 2
3497 D18
3498 D 3
3499 D 3
3500 A15
3501 K17
3502 B 4
3503 B 4
3504 B 4
3505 B 3
3506 D 2
3507 C 4
3508 C 6
3509 E 6
3510 H 5
3511 G 8
3512 L13
3513 L13
3514 L 8
3515 M21
3516 C 2
3517 C 4
3518 B 2
3519 B 2
3520 A 3



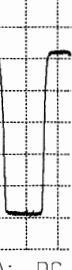
A: DC, Connect



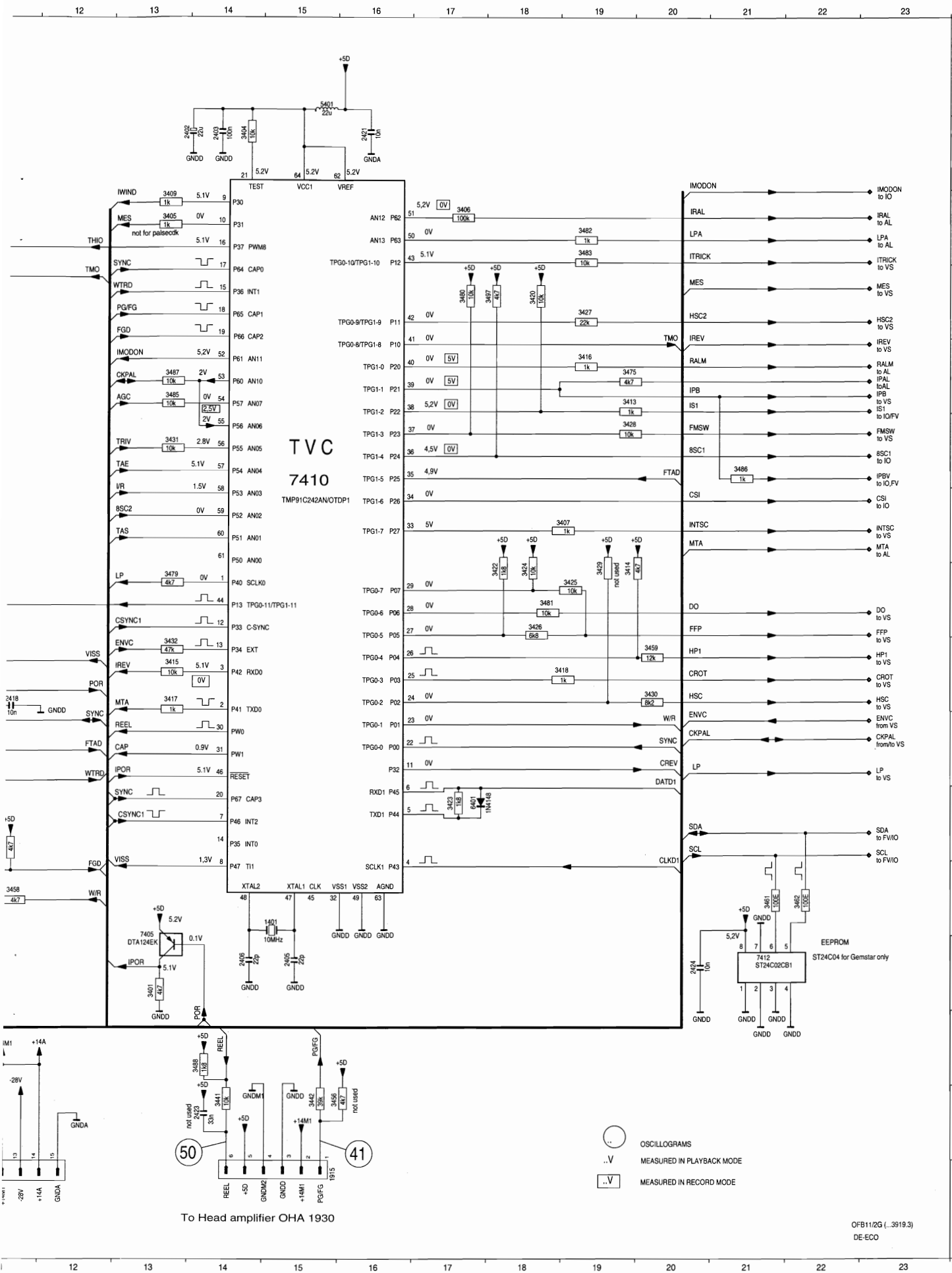
A: DC, Connect



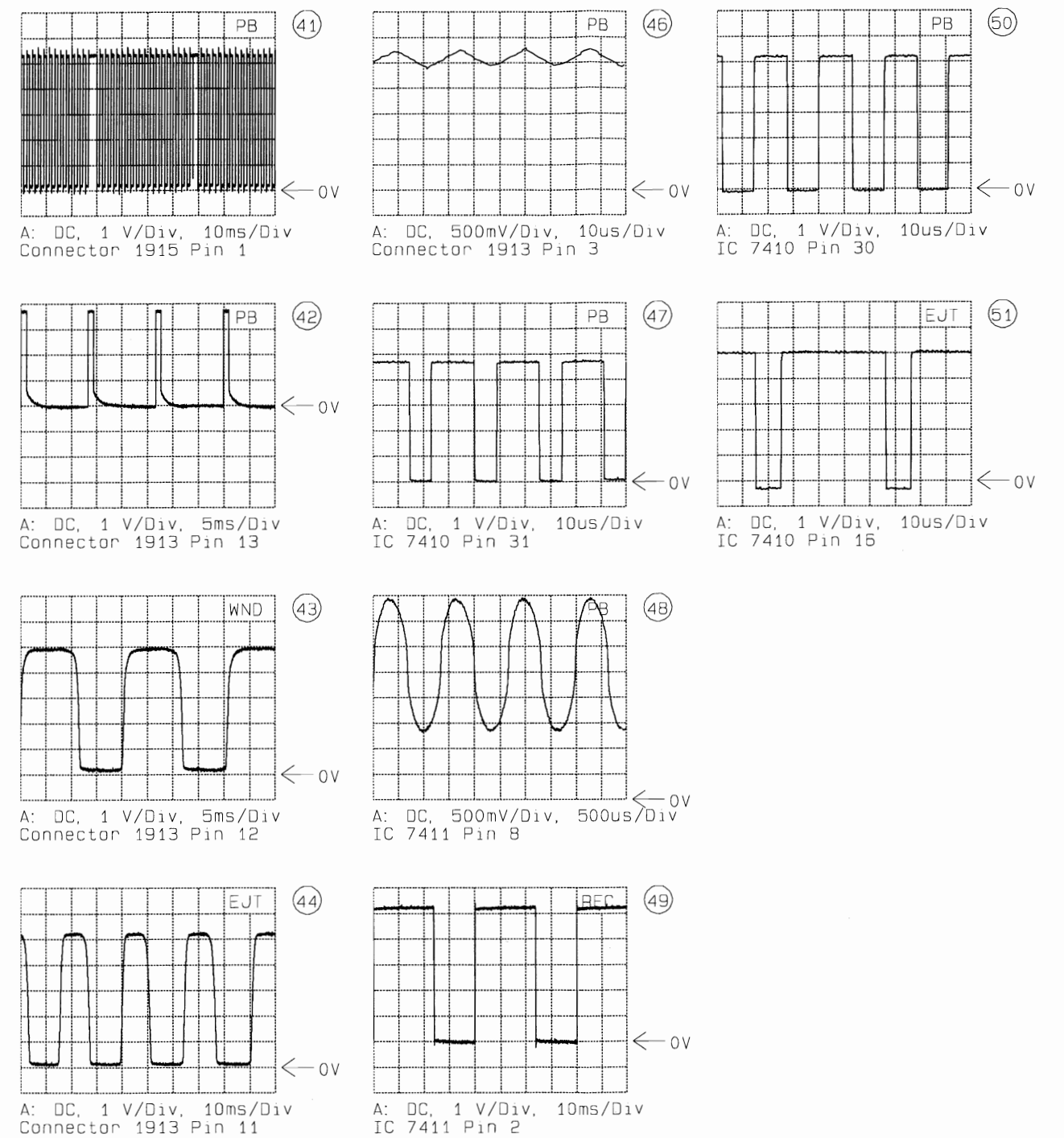
A: DC, Connect



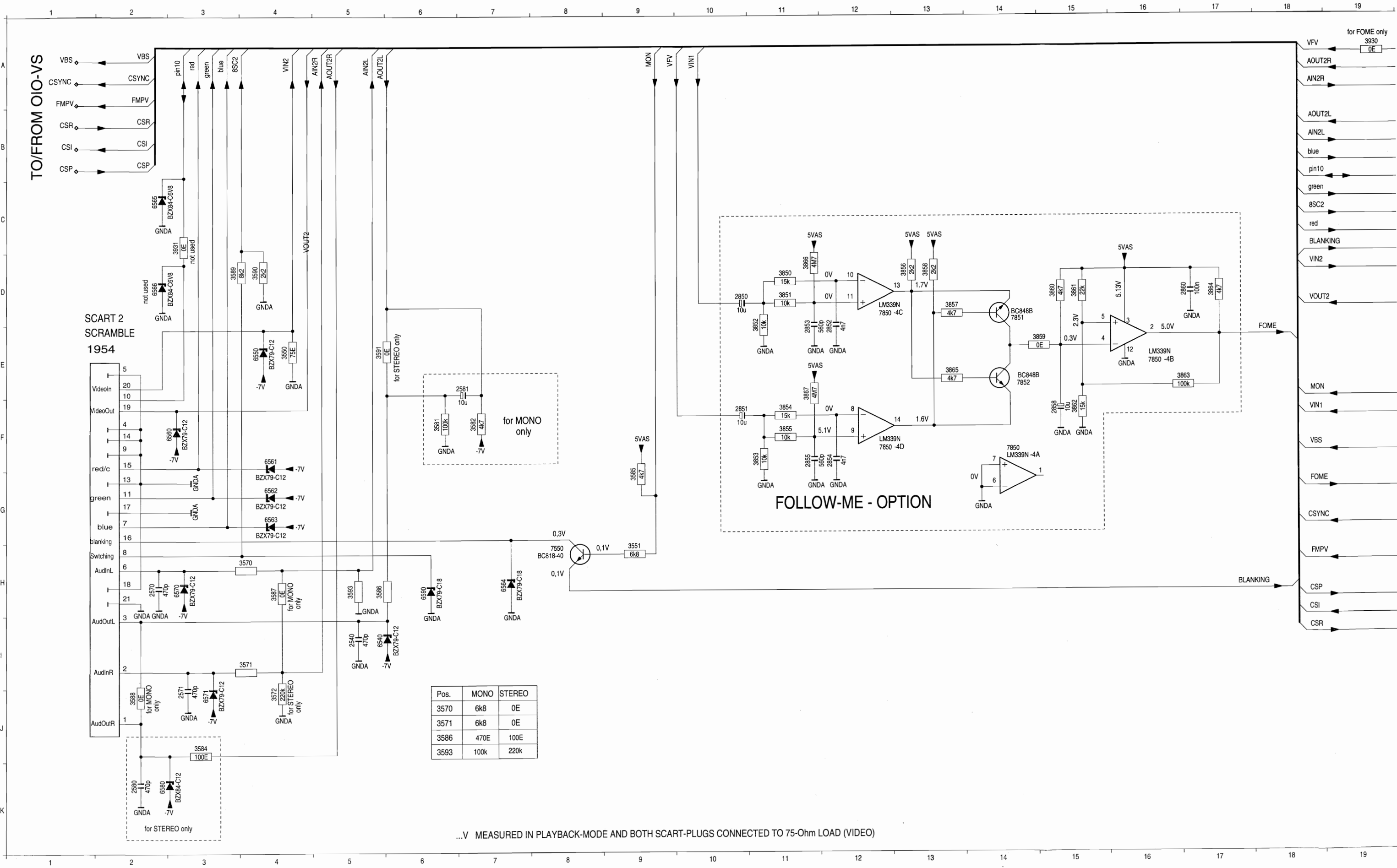
A: DC, Connect

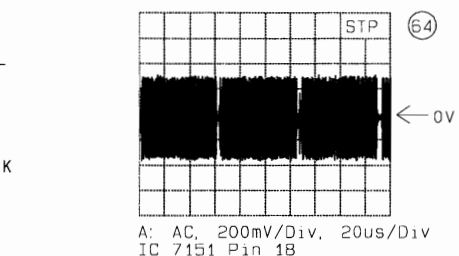
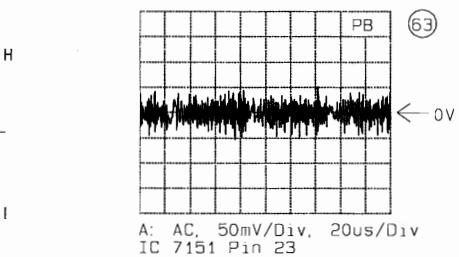
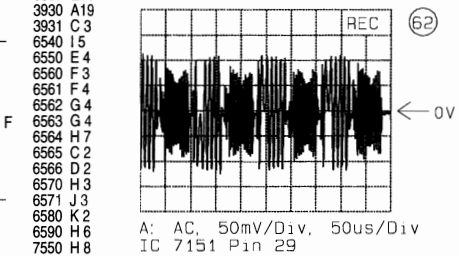
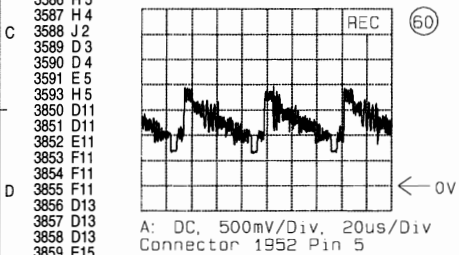
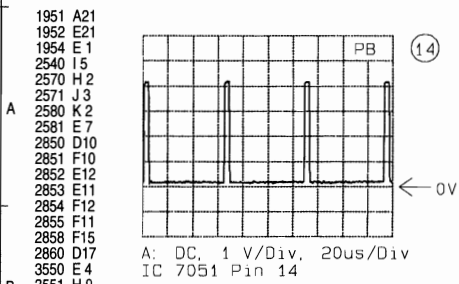
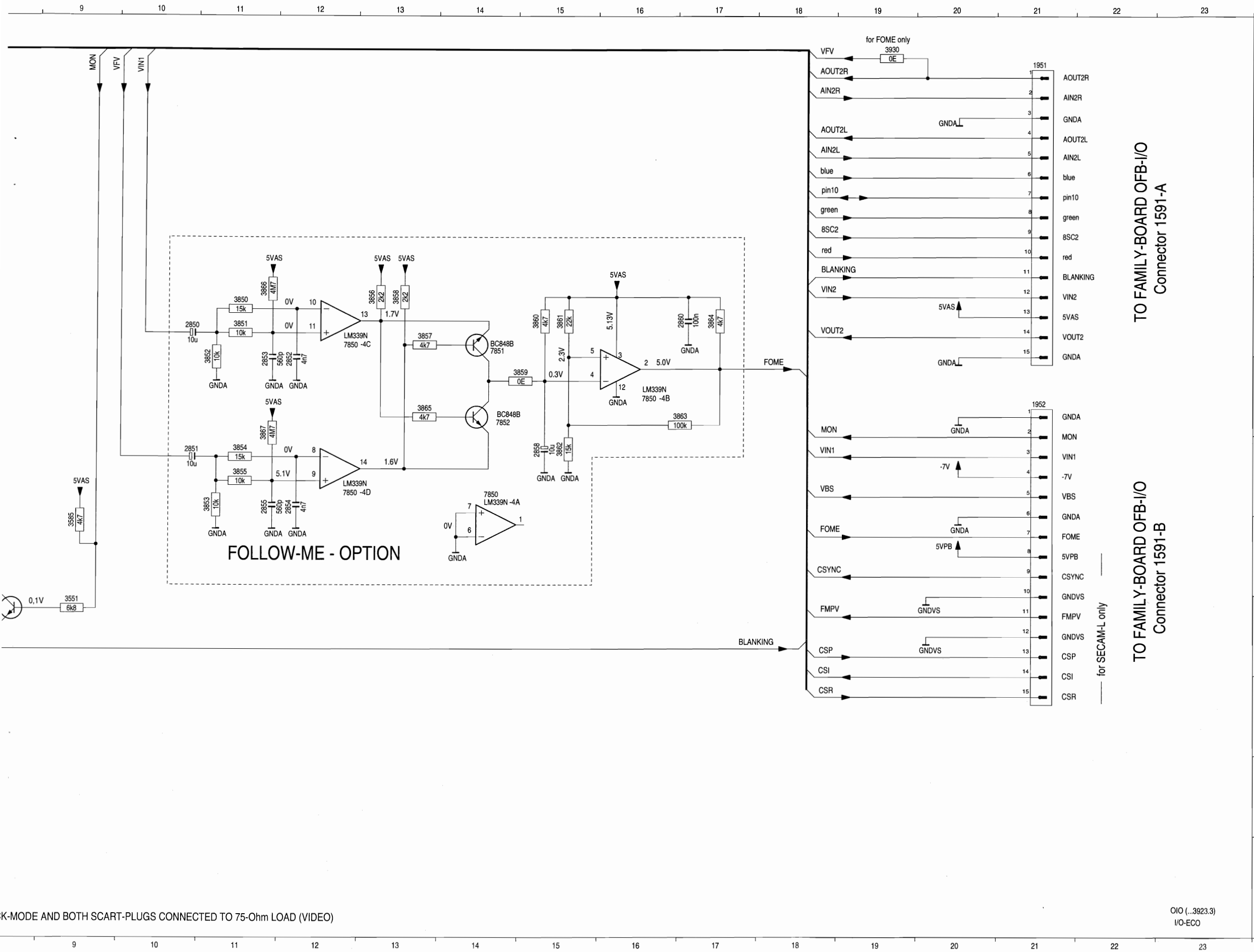


- 1400 O 9
- 1401 L15
- 1402 M 6
- 1912 P 4
- 1913 N 2
- 1914 P 8
- 1915 P15
- 1916 E 2
- 2402 B13
- 2403 B14
- 2404 H 9
- 2405 M15
- 2406 M14
- 2407 C 6
- 2408 D 5
- 2409 G 6
- 2410 H 7
- 2411 I 5
- 2412 J 5
- 2413 J 6
- 2414 J 7
- 2415 L 5
- 2416 L11
- 2417 L 7
- 2418 I11
- 2419 N 3
- 2420 N 2
- 2421 B16
- 2422 A 4
- 2423 O14
- 2424 M20
- 2425 A 4
- 2426 B14
- 2427 B 2
- 2428 C 7
- 2429 M13
- 2430 M 3
- 2431 B14
- 2432 C13
- 2433 C17
- 2434 G19
- 2435 D 8
- 2436 B14
- 2437 C13
- 2438 F 8
- 2439 G 8
- 2440 G10
- 2441 E19
- 2442 H19
- 2443 I13
- 2444 E19
- 2445 I13
- 2446 I19
- 2447 G10
- 2448 D18
- 2449 I 2
- 2450 H18
- 2451 K17
- 2452 H18
- 2453 H19
- 2454 D19
- 2455 F19
- 2456 H19
- 2457 I20
- 2458 F13
- 2459 I13
- 2460 D 7
- 2461 E 7
- 2462 F 6
- 2463 F 7
- 2464 E 7
- 2465 D 7
- 2466 C 7
- 2467 E 5
- 2468 O14
- 2469 O15
- 2470 J 3
- 2471 K 3
- 2472 M 3
- 2473 M 3
- 2474 L 5
- 2475 L 6
- 2476 J 5
- 2477 J 6
- 2478 I 6
- 2479 I 6
- 2480 O15
- 2481 K11
- 2482 L11
- 2483 I20
- 2484 O 3
- 2485 L21
- 2486 L22
- 2487 M 9
- 2488 C 3
- 2489 E19
- 2490 H13
- 2491 D17
- 2492 H18
- 2493 C19
- 2494 C19
- 2495 E13
- 2496 F21
- 2497 E13
- 2498 N14
- 2499 M 3
- 2500 D 2
- 2501 C 3
- 2502 A 2
- 2503 B 2
- 2504 C 4
- 2505 C 5
- 2506 B 2
- 2507 D18
- 2508 D 3
- 2509 A15
- 2510 K17
- 2511 B 4
- 2512 B 4
- 2513 B 3
- 2514 D 2
- 2515 C 6
- 2516 E 6
- 2517 H 5
- 2518 G 8
- 2519 L13
- 2520 F15
- 2521 L 8
- 2522 M21
- 2523 C 2
- 2524 C 4
- 2525 B 2
- 2526 A 3

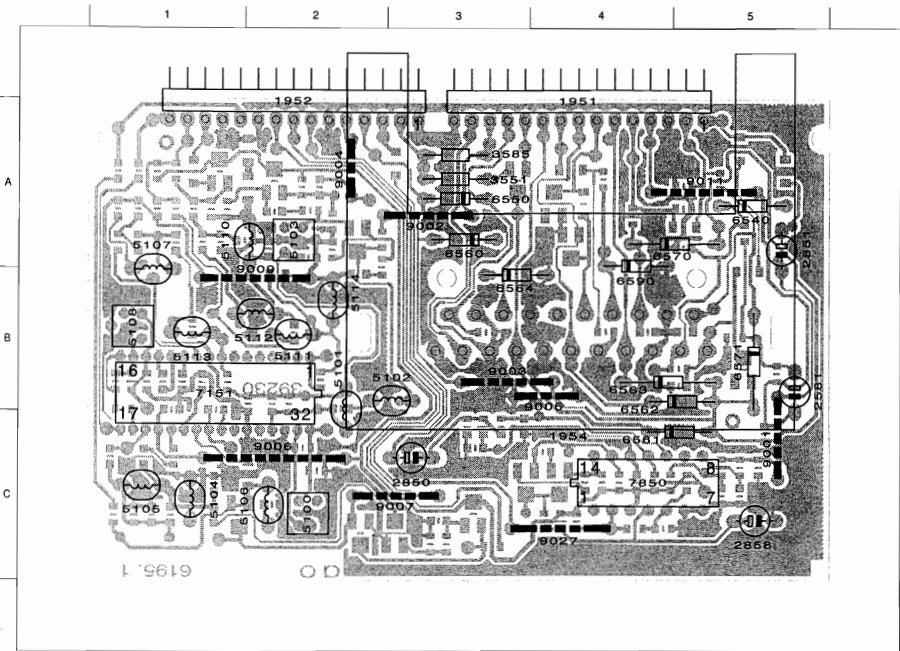


OIO Board, In/Out - Part

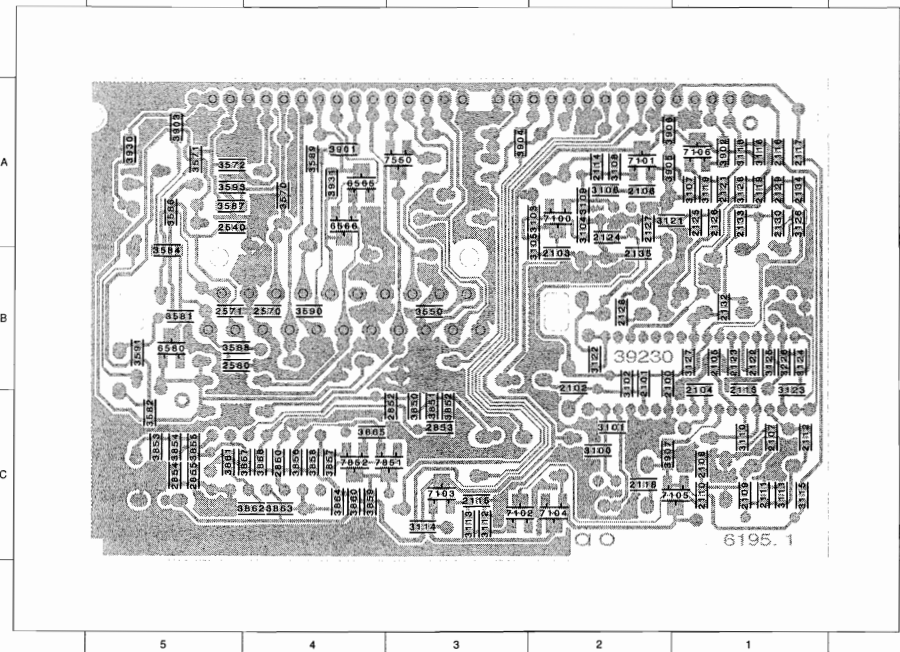




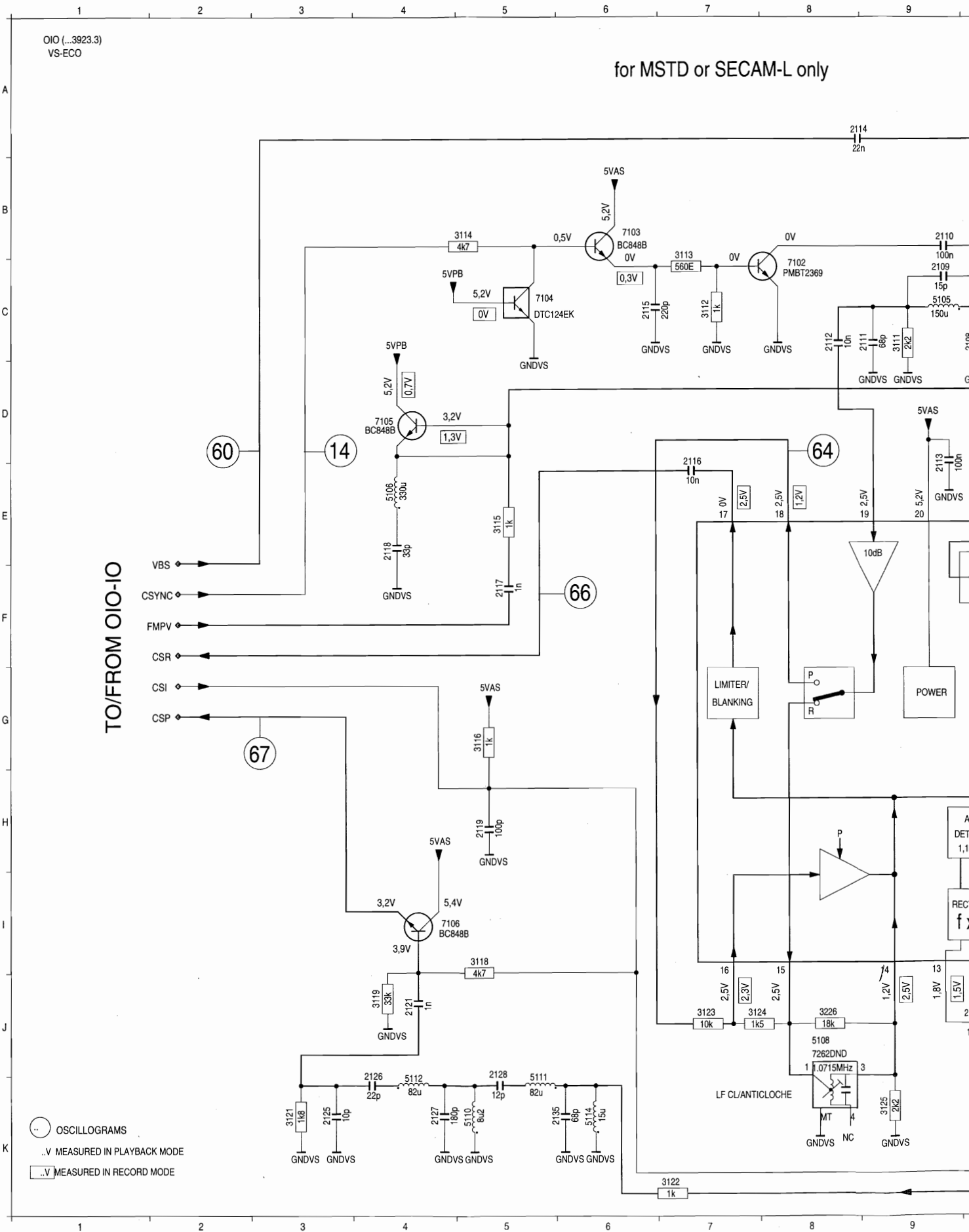
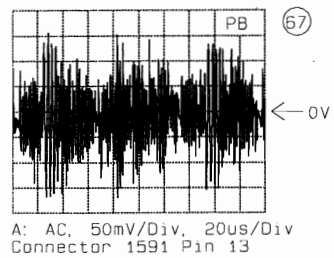
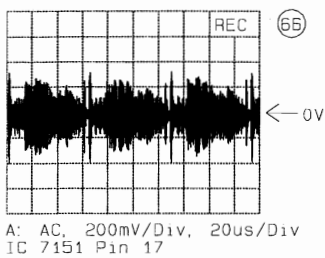
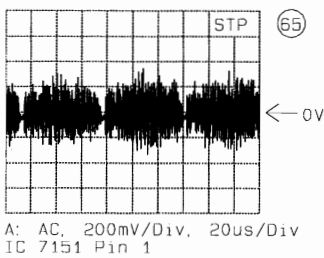
OIO Board - VS-Part

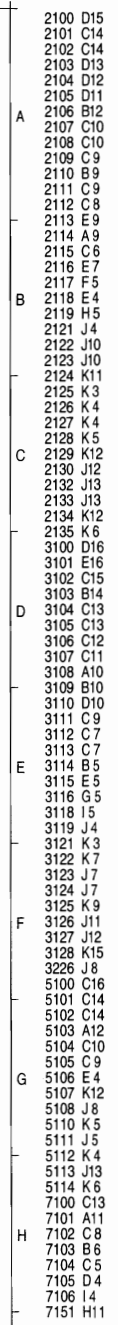


1951 A 4	9003 B 3
1952 A 2	9004 A 2
1954 B 4	9005 B 4
2581 B 5	9006 C 2
2850 C 3	9007 C 3
2851 A 5	9009 B 2
2858 C 5	9011 A 5
3551 A 3	9027 C 4
3585 A 3	
A 5100 C 2	
5101 B 2	
5102 B 3	
5103 A 2	
5104 C 1	
5105 C 1	
5106 C 2	
5107 B 1	
5108 B 1	
B 5110 A 2	
5111 B 2	
5112 B 2	
5113 B 1	
5114 B 2	
6540 A 5	
6550 A 3	
6560 A 3	
6561 C 5	
C 6562 B 5	
6563 B 4	
6564 B 3	
6570 A 5	
6571 B 5	
6590 A 4	
7151 B 1	
7850 C 4	
9001 C 5	
9002 A 3	

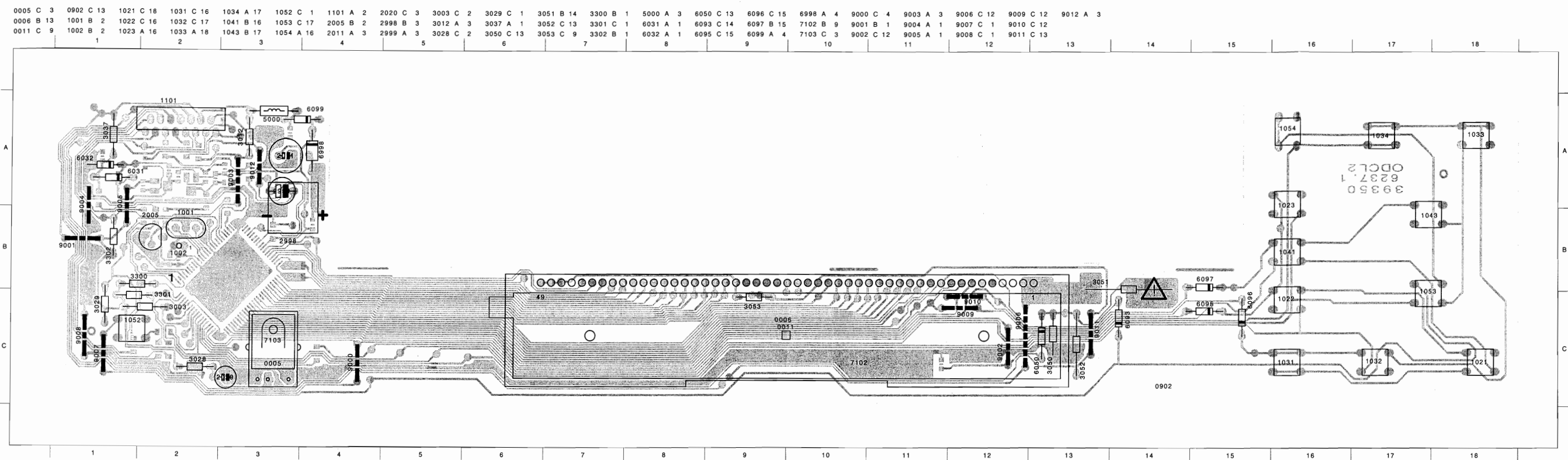


2100 B 2	2580 B 5	3572 A 5	3931 A 4
2101 B 2	2852 C 3	3581 B 5	6565 A 4
2102 B 2	2853 C 3	3582 C 5	6566 A 4
2103 B 2	2854 C 5	3584 B 5	6580 B 5
2104 B 1	2855 C 5	3586 A 5	7100 A 2
2105 B 1	2860 C 4	3587 A 5	7101 A 2
2106 A 2	3100 C 2	3588 B 5	7102 C 3
2107 C 1	3101 C 2	3589 A 4	7103 C 3
2108 C 1	3102 B 2	3590 B 4	7104 C 2
A 2109 C 1	3103 A 2	3591 B 5	7105 C 1
2110 C 1	3104 A 2	3593 A 5	7106 A 1
2111 C 1	3105 A 2	3850 C 3	7550 A 3
2112 C 1	3106 A 2	3851 C 3	7851 C 3
2113 B 1	3107 A 1	3852 C 3	7852 C 4
2114 A 2	3108 A 2	3853 C 5	
2115 C 3	3109 A 2	3854 C 5	
2116 A 1	3110 C 1	3855 C 5	
2117 A 1	3111 C 1	3856 C 4	
B 2118 C 2	3112 C 3	3857 C 4	
2119 A 1	3113 C 3	3858 C 4	
2121 A 1	3114 C 3	3859 C 4	
2122 B 1	3115 C 1	3860 C 4	
2123 B 1	3116 A 1	3861 C 5	
2124 A 2	3118 A 1	3862 C 4	
2125 A 1	3119 A 1	3863 C 4	
2126 A 1	3121 A 1	3864 C 4	
2127 A 2	3122 B 2	3865 C 4	
C 2128 B 2	3123 B 1	3866 C 4	
2129 A 1	3124 B 1	3867 C 4	
2130 A 1	3125 B 1	3901 A 4	
2132 B 1	3126 A 1	3902 A 1	
2133 A 1	3127 B 1	3903 A 5	
2134 A 1	3128 A 1	3904 A 3	
2135 B 2	3226 B 1	3905 A 2	
2540 A 5	3550 B 3	3906 A 2	
2570 B 4	3570 A 4	3907 C 2	
2571 B 5	3571 A 5	3930 A 5	

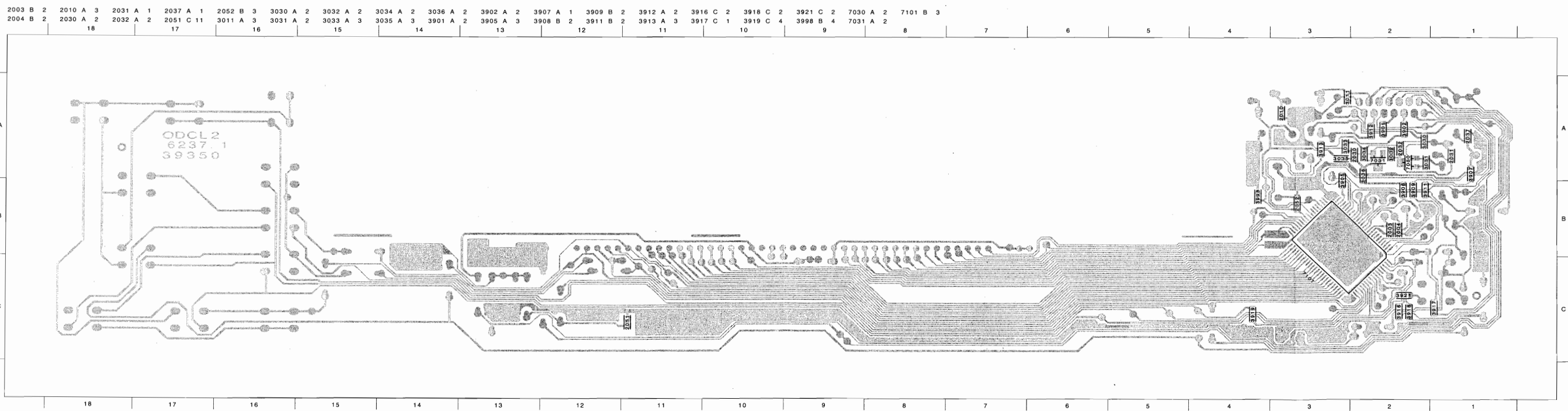




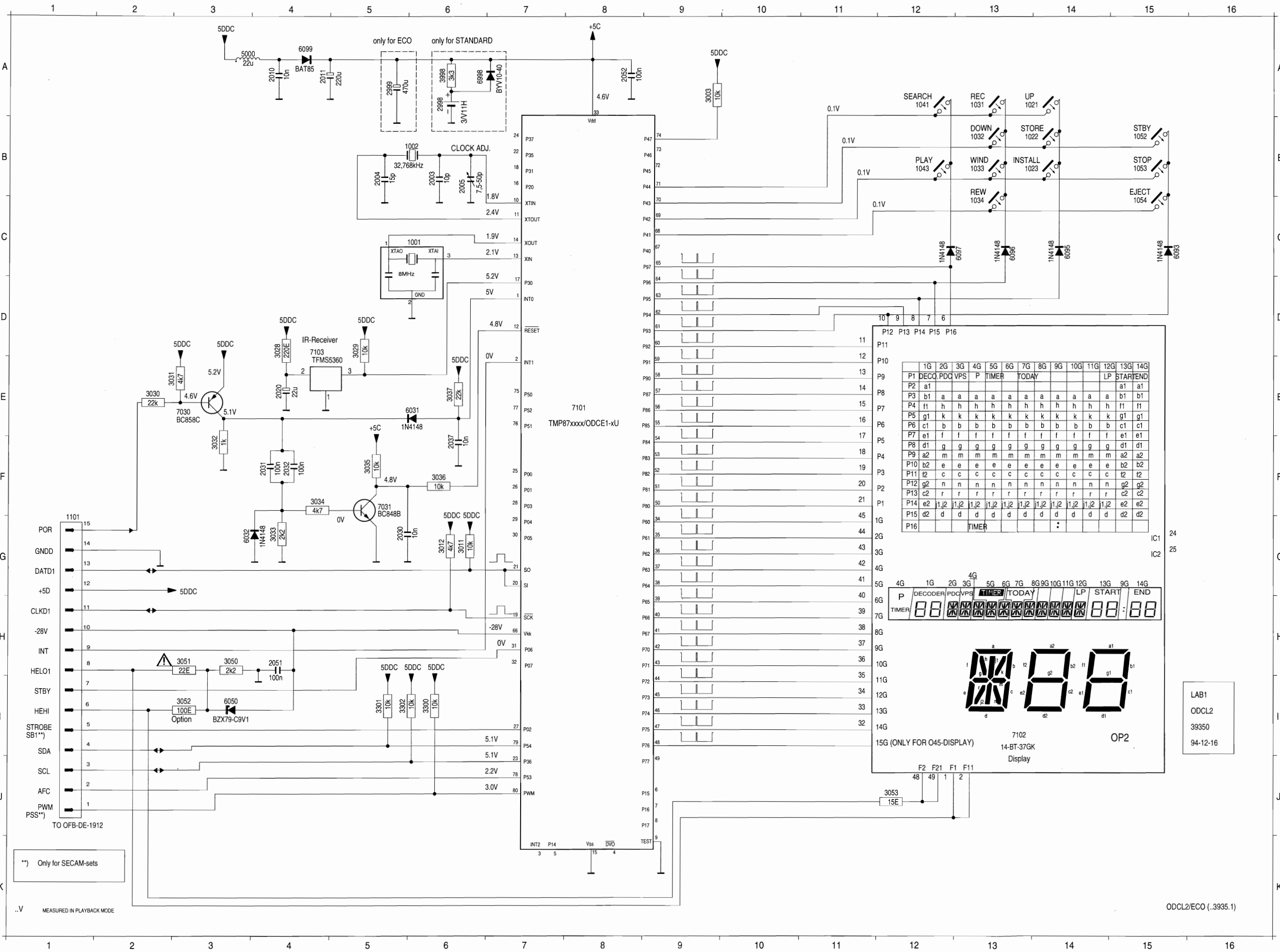
Operating Panel ODCL2



Operating Panel ODCL2



Operating Panel ODCL2



- 1001 C 6
- 1002 B 6
- 1021 A13
- 1022 B13
- 1023 B13
- 1031 A13
- 1032 B13
- 1033 B13
- 1034 C13
- 1041 A12
- 1043 B12
- 1052 B15
- 1053 B15
- 1054 C15
- 1101 G 1
- 2003 B 6
- 2004 B 5
- 2005 B 6
- 2010 A 4
- 2011 A 4
- 2020 E 4
- 2030 G 5
- 2031 F 4
- 2032 F 4
- 2037 F 6
- 2051 H 4
- 2052 A 8
- 2998 A 6
- 2999 A 5
- 3003 A 9
- 3011 G 6
- 3012 G 6
- 3028 D 4
- 3029 D 5
- 3030 E 2
- 3031 E 3
- 3032 F 3
- 3033 G 4
- 3034 F 4
- 3035 F 5
- 3036 F 6
- 3037 E 6
- 3050 H 3
- 3051 H 3
- 3052 I 3
- 3053 J12
- 3300 I 6
- 3301 I 5
- 3302 I 5
- 3998 A 6
- 5000 A 3
- 6031 E 6
- 6032 G 3
- 6050 I 3
- 6093 C15
- 6095 C14
- 6096 C13
- 6097 C13
- 6099 A 4
- 6998 A 6
- 7030 E 3
- 7031 F 5
- 7101 E 8
- 7102 I13
- 7103 D 4

**) Only for SECAM-sets

ODCL2/ECO (..3935.1)

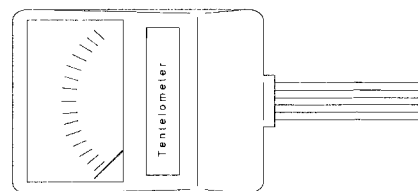
4. DRIVE ASSEMBLY

This tape deck has three motors; one providing precision drive for the scanner unit; the second providing direct drive for the capstan and belt drive for the reel tables; the third motor drives the lift and tape threading/dethreading operations.

Special features are:

Quick start
Short winding time
Automatic cleaning of video heads by cleaning roller

To obtain a high repair standard we have developed a range of service kit's. These kit's covers the spare parts which are engaged together.



Tentelometer



Tool for tapetension adjustment

4.1 Deck parts replacement

Before repairing a deck assembly the top and bottom covers should be removed.

The procedure for the removal and refitting of the following parts is described; only the lift, the scanner, the capstan motor and the A/C head are fixed by screws.

All the other deck assembly parts are held only by snap hooks.

Manual extraction of cassette:

If, after the Eject button has been pressed, the drive does not unthread and eject the cassette, the dethreading/eject operation can also be carried out manually by turning the wheel at the rear of the threading motor.

To avoid slack tape, alternate this action with the movement of the capstan motor (counter-clockwise), until the tape is completely taken into the cassette.

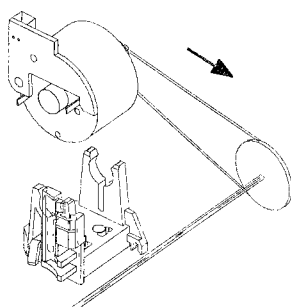
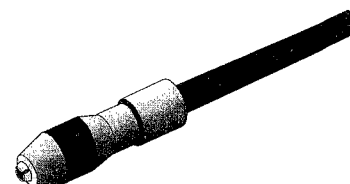
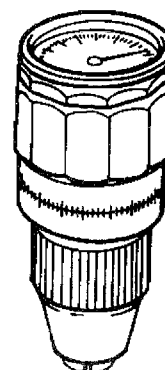


Fig. 1



Handle



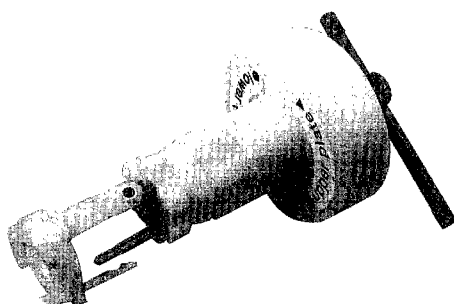
Torquemeter:

600 gf-cm
90 gf-cm

IMPORTANT:

After each repair has been carried out in the drive assembly, the first operation after repairing must be to bring the cassette compartment into "eject" position by hand.

Auxiliary tools for deck adjustment:



Tool for removing the head disc



Post adjustment screwdriver

Testcassette

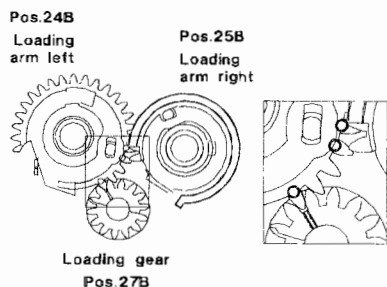
Nylon gloves

4.1.1 Deck lay out diagram

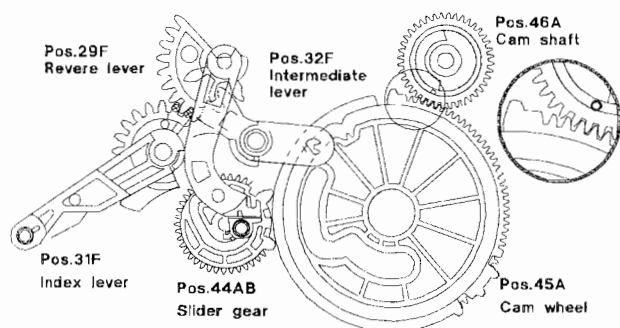
Deck in position "threaded out".

The following diagrams indicate the relative position of the gearwheels and levers when the deck is in the threaded out (cassette compartment down) position.

Top view



Top view



4.1.2 The Lift

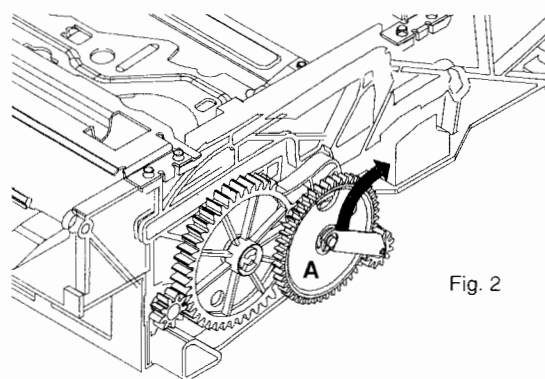
Refitting the lift compartment:

Ensure the lift compartment is down and gear A is rotated one click anticlockwise from the down position.

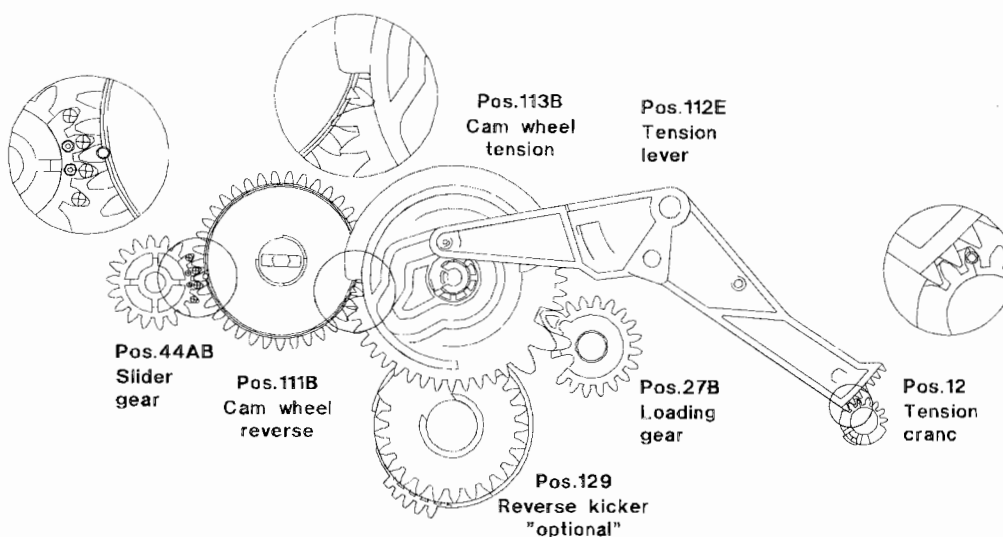
The removal and refitting of the lift can be carried out in all deck positions with the exception of "eject" (ensure that gears 103/105 are free).

To remove the lift

- Free the holding bracket (Fig. 2) by rotating it up and back from the upper end.
- Unscrew the 4 screws on the underside of the deck.
- Carefully remove the lift vertically, noting the position of the record protect operating lever.



Underside view



4.1.3 Head disc replacement

Removal :

- Nylon gloves should be worn when handling the head disc.
- Turn the headdisc until the long hole of the rotor appears in the bigger hole of the scannermotor
- Insert the reference pin C (included with each service head disc) through the bigger hole of the lid of the scanner motor until the pin snaps in the long hole of the rotor. (Fig. 3)

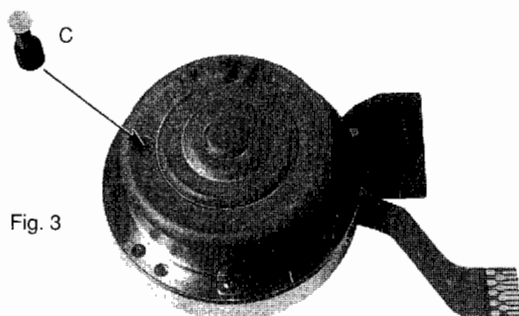


Fig. 3

Important:

Choose Installation/Removal of the upper/lower clamping element by turning and attaching the reference element to the tool. (Fig. 4)

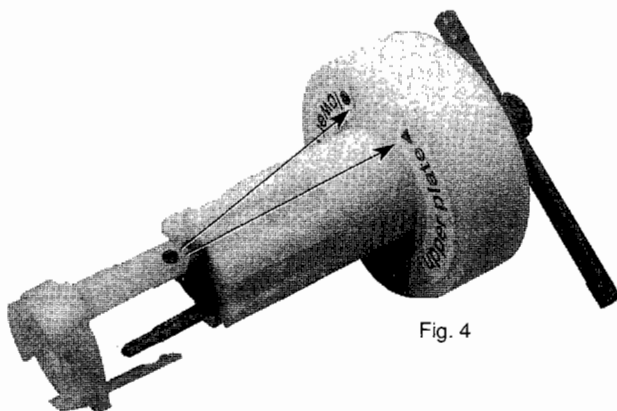


Fig. 4

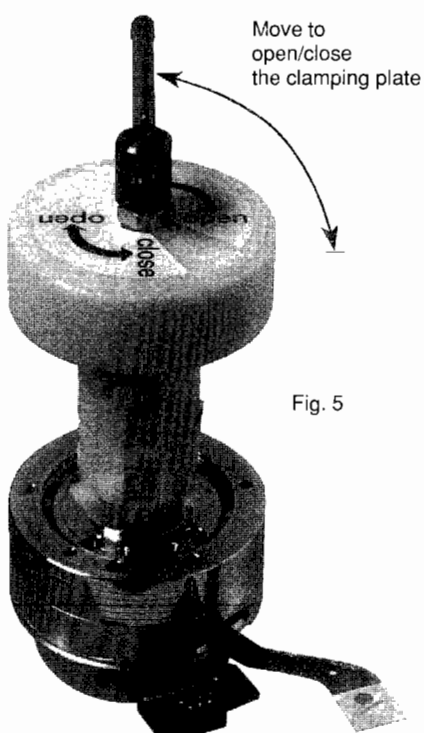


Fig. 5

- Position the tool on the upper clamping element, loosen the clamping element by turning the lever 90 degrees and remove it from the head disc. (Fig. 5)

- Prepare the tool for the lower clamping element. Position the tool on the head disc and make sure that all 3 pins are snapped in the the lower clamping element. Loosen the clamping element by turning the lever 90 degrees and remove the head disc plus the tool from the scanner spindle. (Fig.6)

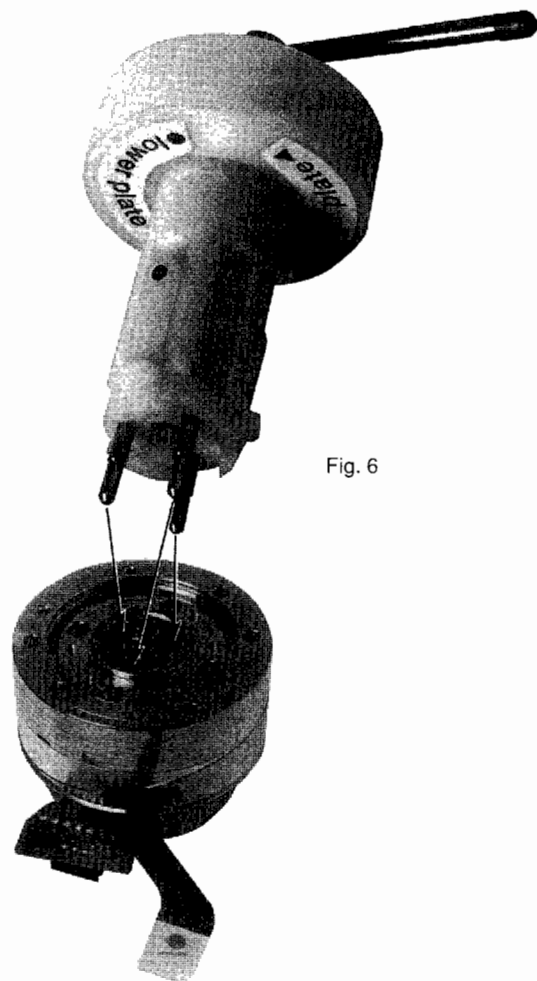


Fig. 6

Installation:

- Before carrying out the installation of the new head disc make sure that the scanner motor spindle is clean and undamaged. (The spindle has to be free of grease and must not be touched with bare hands)
- Insert the 2 Mylar foils (included with each head disc) in the head disc. (Fig.7)

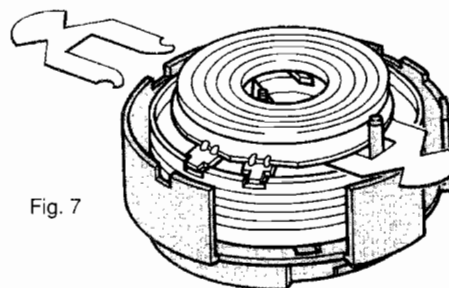


Fig. 7

- Position the tool (reference: lower clamping element) on the new headdisc (with protective cover) and loosen the lower clamping element.
- Position the head disc so that pin D of the protective cover engages in the hole of the stator (the arrow on the protective cover must point towards the scanner print). (Fig. 8)

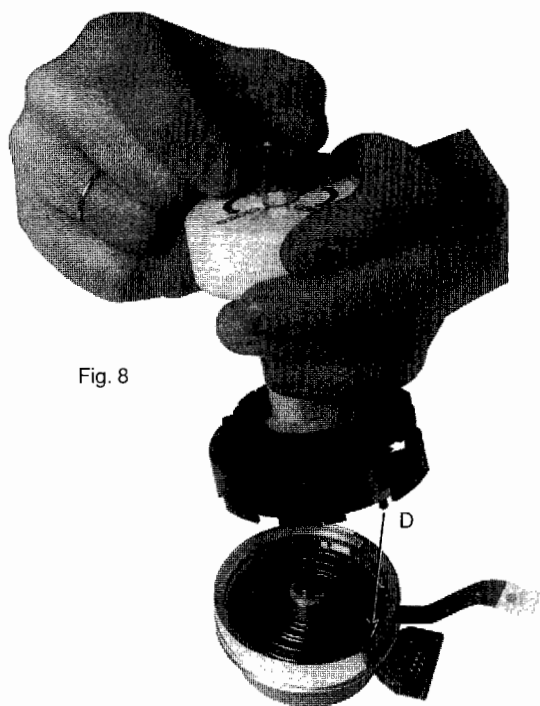


Fig. 8

- Reach the exact position through pressing the tool down with a force of 1 N. and fix the lower clamping element by turning the lever towards "close".
- Remove the tool.
- Change the tool to "upper clamping element" and position the clamping element exactly. (Fig. 9)

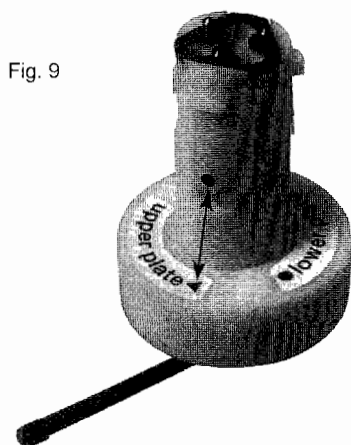


Fig. 9

- Tighten the clamping element through turning the lever towards "open".
- Position the tool planely on the head disc and fix the clamping element. (Fig.5 "close")
- Remove the protecting cap from the head disc, withdraw the two Mylar foils and remove the reference pin C.

After replacing the head disc, carry out the following adjustments and checks :

- Head switching pulse (gap position, chapter 3)
- Write current adjustments (chapter 3)
- Check tape path alignment. (see paragraph 4.2.1.)

4.1.4 A/C Head (Combi head) (Pos. 36)

- Remove fixing spring (A) (Fig. 10).
- Remove the fixing screw and replace the A/C head.
- Use a new fixing spring (included with new A/C head) for reassembly.

After the A/C head has been replaced, all adjustments described in paragraph 4.2.1.2 and paragraph 4.2.1.3 have to be carried out.

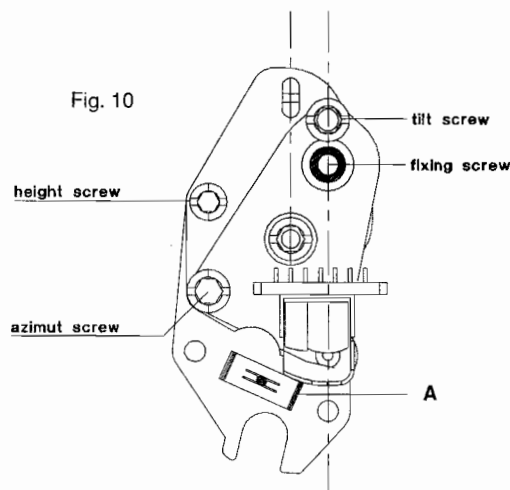


Fig. 10

4.1.5 Threading motor (Pos. 38)

- Remove the belt and disconnect the connector plug.
- Remove the threading motor from the motor supports (Fig. 11).

During reassembly ensure that the threading motor is correctly located in the front and rear supports.

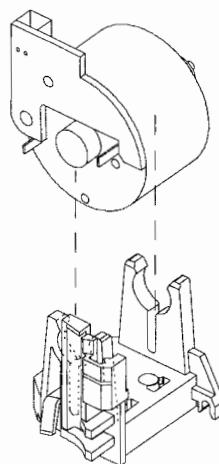


Fig. 11

4.1.6 Capstan motor (Pos. 127)

- Set the drive assy to "Eject" position.
 - Remove the belt (pos.126) on the underside; then free the pin from the sensor print (see section 4.1.10). Lift sensor print part vertically (it is plug and socket connected to the capstan motor print). Move both sections of the sensor print clear of the capstan motor.
 - Remove the three capstan motor fixing screws (Fig. 12) and withdraw the capstan motor downward from the drive assy.
- The reassembly is carried out in reverse order. Make sure that the capstan is free of grease.

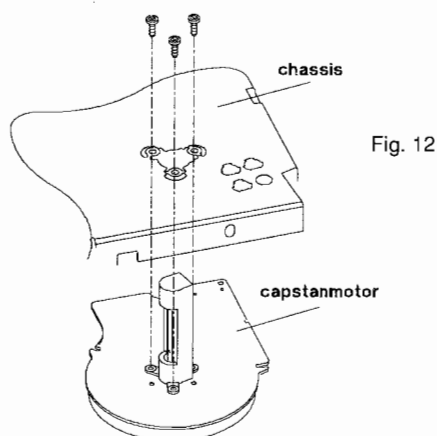


Fig. 12

4.1.7 Pressure roller (Pos. 37)

- Set the drive assy to "Eject" position.
- Unhook and remove the pressure roller tension spring.
- Release the pressure roller guide (pos. 41G) from the guide in the threading motor holder by pressing the top of the motor guide rearwards and rotating the pressure roller guide assembly clockwise by approximately a quarter of a turn. (see Fig. 13) The pressure roller and guide can now be lifted clear.

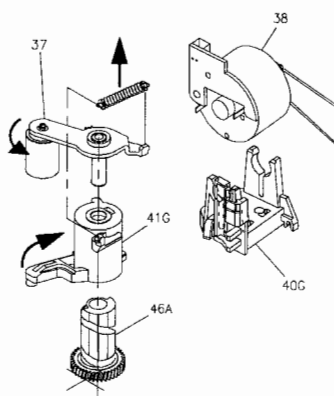
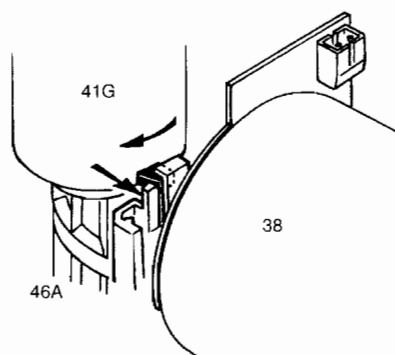


Fig. 13



Ensure that no grease from the pressure roller guide gets to the capstan or pressure roller.
The reassembly is carried out in reverse order.

4.1.8 Roller unit right (Pos. 26)

- Set the drive assy to "Eject" position.
- Compress the two snap hooks by means of a pair of tweezers and remove the roller assy from the roller unit right (Fig. 14).
- Unhinge the loading arm right from the holding plate and push the latter towards the front of the deck to remove from the guide (right).

NOTE: During reassembly ensure the link from 25B is engaged in the hole of the holder plate 26

After replacing the roller unit (right), the tape path has to be checked, and adjusted if necessary (paragraph 4.2.1).

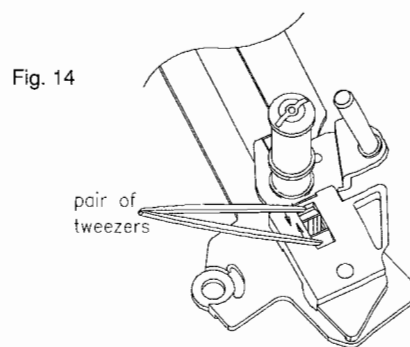


Fig. 14

4.1.9 Roller unit left (Pos.23)

- Set the drive assy to "Eject" position.
- Unhook the tension arm spring (pos. 11), to avoid the tension arm spring being pre-loaded.
- At the bottom side of the drive assy, partially unhinge the sensor mounting print and remove the tension lever (pos.112).
- Compress the two snap hooks by means of a pair of tweezers (Fig. 9) and remove the roller assy (A) from the plate (B).
- Unhinge the loading arm (left) from the holding plate and remove the latter downward from the drive assy through the recess in the chassis (Fig. 15).

The reassembly is carried out in reverse order.

NOTE: During reassembly

1. Place the carriage holding plate in the assembly with the half-round cutout nearest the rear of the deck.
2. When the loading arm is refitted ensure the pin on the underside of 23 is through the link of 24B.

After replacing the roller unit (left) the tape path has to be checked (paragraph 4.2.1.), and adjusted if necessary.

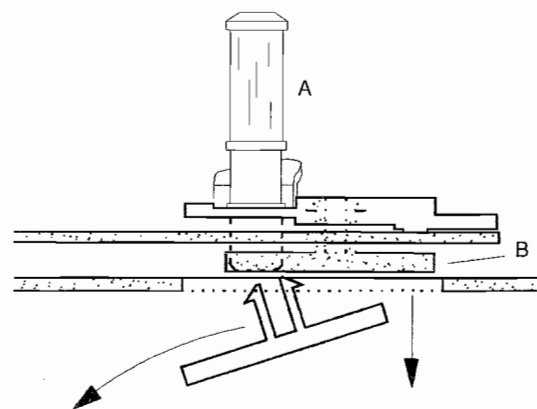


Fig. 15

4.1.10 Sensor print assy (Pos. 118)

For circuit diagram and electrical data see deck electronics (chapter 3).

If a part of the sensor print is defective the whole sensorprint has to be replaced.

Proceed as follows:

- Remove the deck assembly from the set.
- Lift the sensor print vertically, it is plug and socket connected to the capstan motor print.
- All other parts are attached by means of snap hooks and are easily freed.

Reassembly is carried out by snapping the snap hooks into place, and inserting the rivet B.

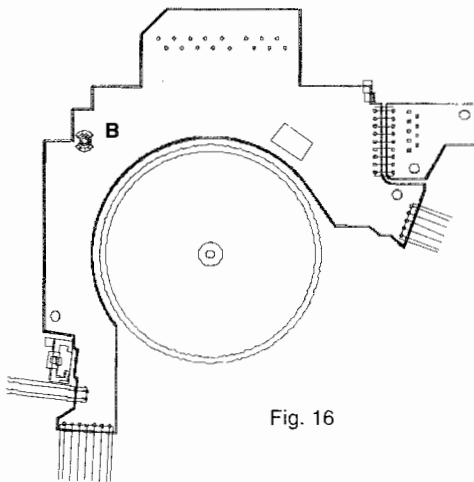


Fig. 16

4.2 Adjustments

4.2.1 Tape path

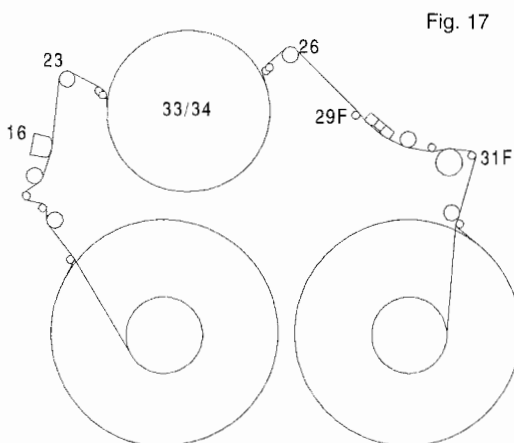


Fig. 17

4.2.1.1 Roller left unit/roller unit right

Preparation:

- Connect one input of a dual trace oscilloscope to observe the tape sync pulse CTL. The other input (DC coupled) to observe the tracking information TRIV.
- Trigger the oscilloscope externally on the head pulse HP1.
- Playback the black and white section of the alignment test tape.
- Set the deck in the condition where the video heads are running along the upper edge of the tracks only by:

1. Press the tracking button.
2. Move the tape sync pulse, in relation to the head pulse, to the left by pressing the +/- button.
3. Stop this movement when a noisy picture (disturbances) is visible on the TV set and the CTL pulse is on the left of the display. The machine will retain this position in memory until a cassette is inserted once again. This condition works only if X-distance is adjusted.

Adjustment:

Adjust the left and right roller units to make the tracking signal TRIV straight and flat as possible (Fig. 18).

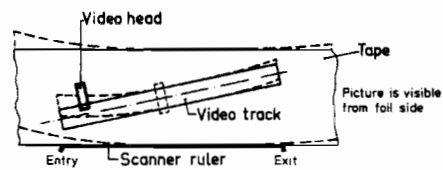
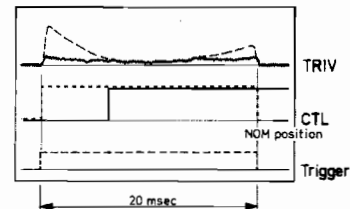


Fig. 18



4.2.1.2 A/C Combi head

Tilt angle adjustment

- Set the drive to feature mode (e.g. +7)

Adjustment **with** tape guide A1:

- By means of the tilt angle adjusting screw move the tape until the lower edge just touches the tape guide A1 (see Fig. 19) the tape must not be distorted at the lower edge (by pressing onto guide).

Adjustment **without** tape guide A1:

- By means of the tilt angle adjustment screw move over the tape until the lower edge just touches the tape guide A2 (see fig.19) (by pressing onto guide). After that turn the tilt angle adjustment screw anticlockwise for 60° - 90° (The tape must not touch guide A2).

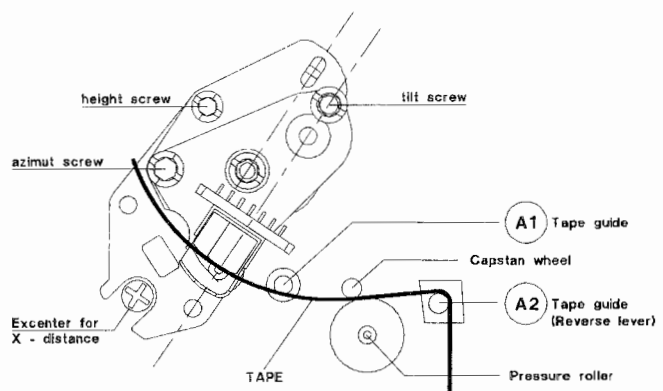


Fig. 19

Adjustment of the azimuth angle and the head height

- Connect an oscilloscope to the linear Audio output.
- Play the section of the test cassette with the audio signal 400 Hz.
- Adjust for maximum output voltage by means of the height adjustment screw
- Play the section of the test cassette with the audio signal 8 kHz.
- Adjust to maximum output voltage by means of the azimuth adjustment screw (Fig. 19).
- If necessary, repeat this procedure
- Check the tilt angle adjustment

If the tape path was completely out of adjustment or if several components in the tape path have been replaced, it is possible, that the adjustments described in paragraph 4.2.1.1 and paragraph 4.2.1.2 have to be repeated several times.

4.2.2 Adjustment of the horizontal distance (x-distance)

- Before this adjustment is carried out, insert the test cassette (start from Eject position). Call the service test program (tracking value will take up its nominal position) and press the "play" button.
- Playback the black/white part of the test cassette.)
- Display the TRIV signal on an oscilloscope (DC-coupled) and adjust for maximum voltage by means of the eccentric screw (Fig.19).

4.2.3 Brake band adjustment

- Set the drive to "Play"
- Adjust the brake band by means of adjusting tool (from the underside of the drive), until the edge of the elbow of the tape tension arm overlaps with the left inner edge of the left guide by 0.5mm (see Fig. 20)

4.2.4 Tape tension adjustment

- Play a VCR cassette (E 180) starting from the beginning of the tape.
- Measure the tape tension before the roller unit left by means of a tentelometer.
- Adjust the tension arm spring (pos.11) to a tape tension of $0,24 \text{ N} \pm 0,02 \text{ N}$ ($24 \text{ g} \pm 2 \text{ g}$) by means of the adjustment tool (from the underside of the drive, Fig. 20).

4.2.5 Friction clutch control check

- Set the drive to "Play" position.
- Place the torquemeter on the right reel.
- Turn the capstan motor to move the right reel clockwise.
- Keep turning, until the indication at the torquemeter no longer changes (Fig. 21)
- The torque has to be $10,5 \text{ mNm} \pm 25\%$ ($105 \text{ gFcm} \pm 25\%$)

4.2.6 Reverse brake control

- Set the drive to "Reverse" position.
- Place a torquemeter on the right reel and turn the latter counterclockwise, until the reel just starts to flip.
- The value indicated at the torquemeter has to be $7 \text{ mNm} \pm 3 \text{ mNm}$ ($70 \text{ gFcm} \pm 30 \text{ gFcm}$) (Fig. 21).

Fig. 20

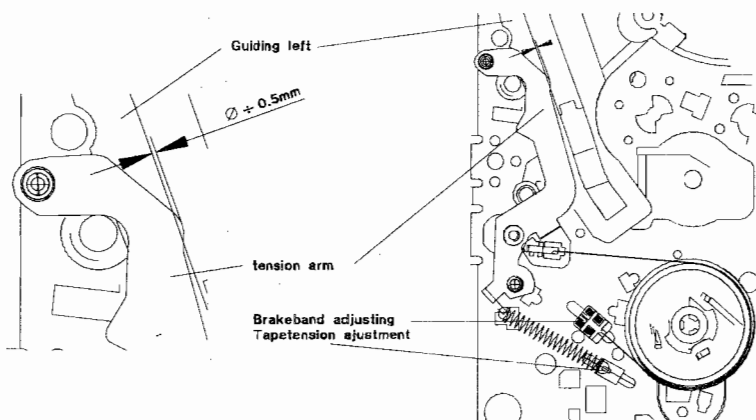
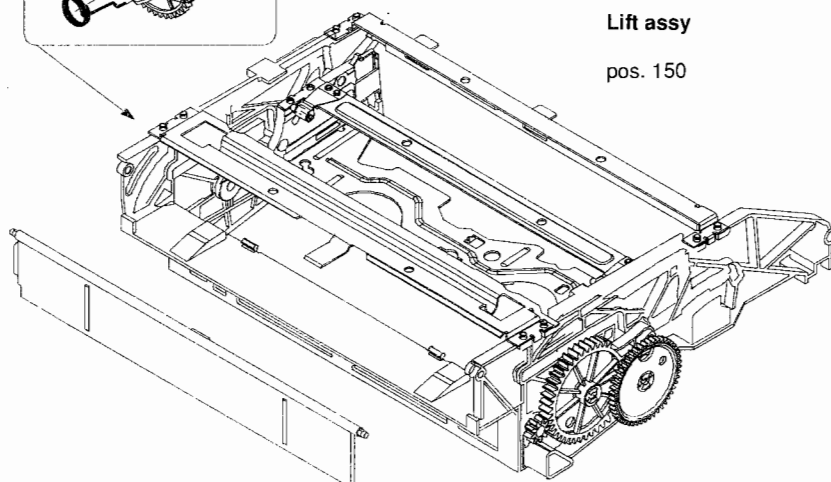
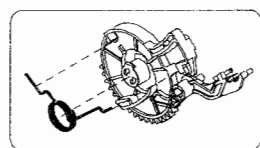
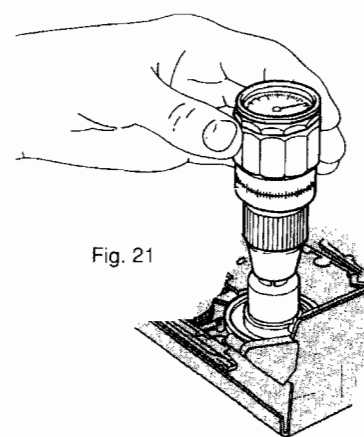


Fig. 21

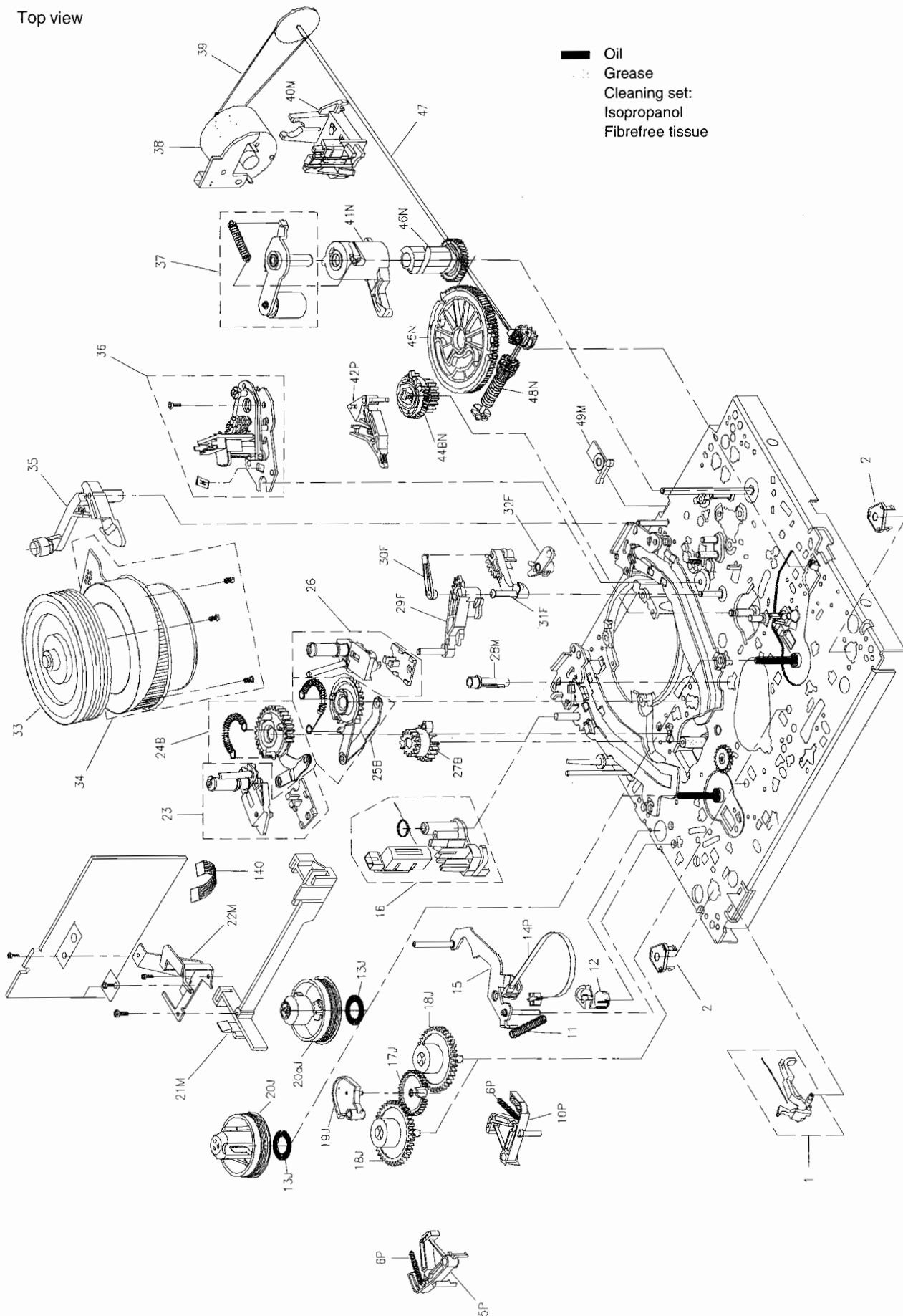


Lift assy

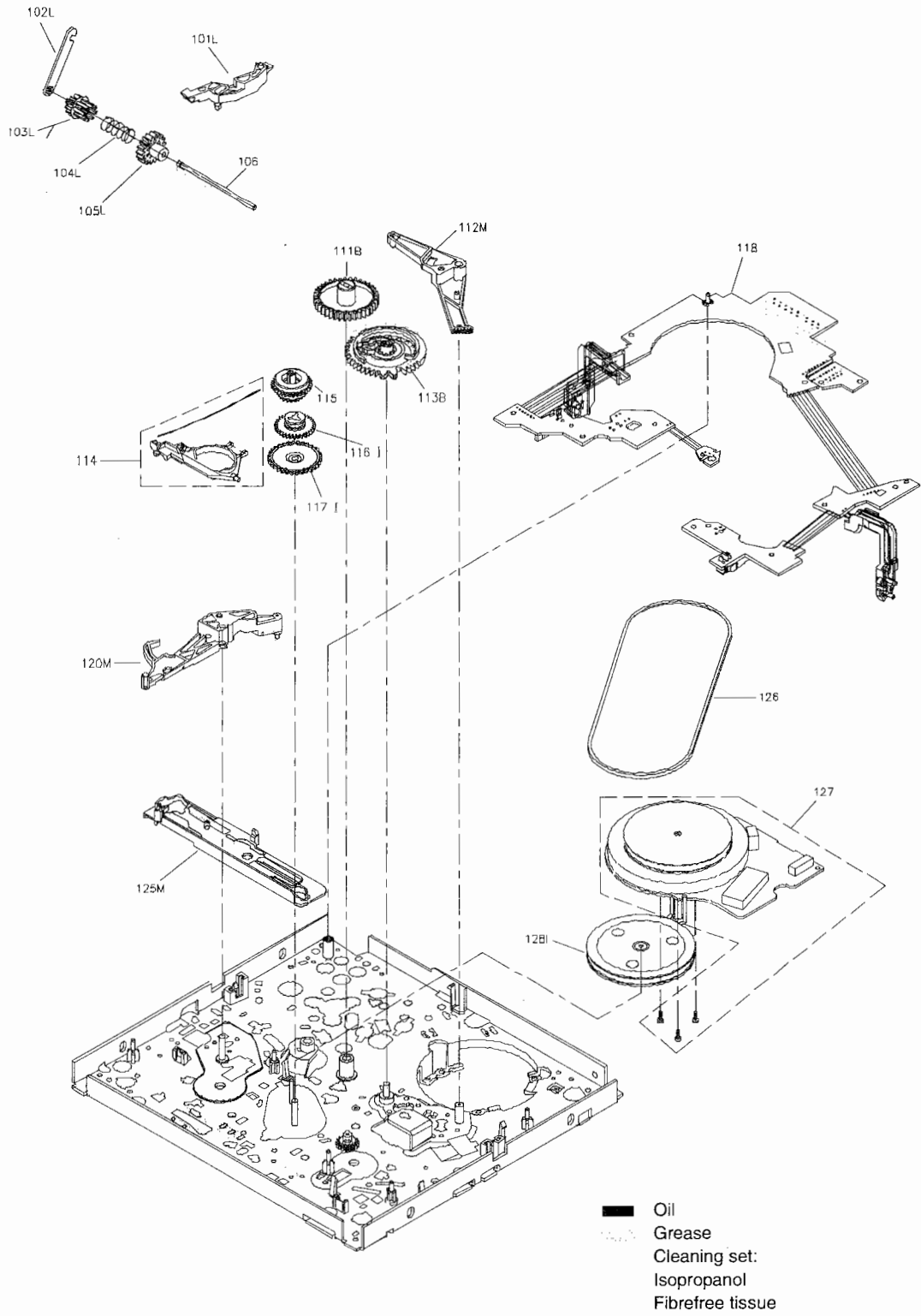
pos. 150

4.3 Exploded view

Top view



Bottom view



PARTS LISTS

Exploded View set

